1. Table of Contents

1. INTRODUCTION .................................................................................................................. 3
2. POWER .................................................................................................................................. 3
3. DATA ..................................................................................................................................... 4
4. AUDIO VISUAL ...................................................................................................................... 4
5. TEACHING STATIONS (TS) .................................................................................................. 7
6. CLASSROOM SUPPORT TECHNOLOGY .............................................................................. 9
1. INTRODUCTION
1.1. The UTM Classroom Technology / Audio Visual Design Specifications is intended to outline the UTM campus requirements for classroom technology and audio visual equipment. This specification provides guidelines for the design of classroom technology and audio visual equipment for all New Construction and Renovation Projects at the campus. It has broad similarities with the criteria adopted by UofT in general; however, it focuses on the specific requirements and preferences of the University of Toronto Mississauga campus which differ from other UofT campuses.
1.2. Close coordination with Facilities Management & Planning, the Information & Instructional Technology Services (IITS) and Police Services is required to ensure proper & effective implementation of these guidelines. For most recent copy of this document, please contact Sana Rasheed, Construction Standards Specialist at UTM Facilities Management & Planning Department.
1.3. WEBSITE
1.3.1. For supporting diagrams and additional information, please check the following website:
1.3.2. Additional supporting documents from the University of Toronto Office Of Space Management can be found here: http://www.osm.utoronto.ca/standards/ . UTM specific classroom technology and audio / visual equipment specifications take precedence over the UofT OSM standards and caution should be taken when utilizing information from this site.
1.4. METHOD
1.4.1. The classroom audio visual specifications are a working tool for the design process, to be used in conjunction with 1) consultation with instructors for the given department and 2) Facilities Management & Planning department (FM&P) designates and 3) the Information & Instructional Technology Services (I&ITS). Described herein are the typical room standards that are currently in place, the manner in which IITS requires the installation to be carried out, preferred products, and finally the programming and interface designs.
1.5. SPECIFIED PRODUCTS / PROCUREMENT
1.5.1. Any specific products or manufacturers listed herein can only be purchased within the confines of University of Toronto procurement policy.
1.6. OBC
1.6.1. All standards assume the architect has ensured compliance with the Ontario Building Code and all applicable codes and standards.
1.7. WARRANTY
1.7.1. All classroom furnishings are to come with a minimum 10-year warranty.
1.8. UNIVERSITY STANDARD SYSTEMS
1.8.1. All classrooms are to be “support capable”, that is, the systems installed will not be proprietary but among those recommended and supportable by the Information & Instructional Technology Services (IITS) department and the department of Facilities Management & Planning of the University of Toronto Mississauga.

2. POWER
2.1. Power outlets:
2.1.1. (duplex) by entrance for caretaking staff
2.1.2. 1 in middle of presentation wall
2.1.3. (quadplex) at teaching station from two separate circuits.
2.1.4. 1 at the left side of screen housing for screen power.
2.1.5. 1 in ceiling at projector location.
2.1.6. 1 at back wall placed 8' (2.4 metres) from the floor directly across from the teaching station for the classroom camera.
2.1.7. General - around room perimeter at 10’ intervals
2.1.8. If video conferencing capable, additional TS power outlet might be required
2.1.9. For 200+ tiered classrooms, add one duplex outlet in a monument on each tier. Please see also section 3.5 for further 200+ floor tier monument requirements. The distribution, setup & number of monuments/outlets shall be approved by both

2.1. Power outlets:
2.1.1. (duplex) by entrance for caretaking staff
2.1.2. 1 in middle of presentation wall
2.1.3. (quadplex) at teaching station from two separate circuits.
2.1.4. 1 at the left side of screen housing for screen power.
2.1.5. 1 in ceiling at each projector location.
2.1.6. 1 in ceiling at each ALC projector location or 1 on wall at each display monitor location per future student table.
2.1.7. 1 at back wall placed 8’ (2.4 metres) from the floor directly across from the teaching station for the classroom camera.
2.1.8. Minimum of 2 at the ceiling level for the presentation camera(s)
2.1.9. General - around room perimeter at 10’ intervals
2.1. Power outlets:
2.1.1. (duplex) by entrance for caretaking staff
2.1.2. (quadplex) at teaching station from two separate circuits.
2.1.3. 1 at the left side of screen housing for screen power.
2.1.4. 1 in ceiling at each projector location.
2.1.5. 1 in ceiling at each projector location or 1 on wall at each display monitor location per future student table.
2.1.6. 1 at back wall placed 8’ (2.4 metres) from the floor directly across from the teaching station for the classroom camera.
2.1.7. Minimum of 2 at the ceiling level for the presentation camera(s)
2.1.8. General - around room perimeter at 10’ intervals
2.1.9. Floor monuments to be provided
### Traditional

FM&P and I&ITS designates prior supply, install and/or construction.

### ALC Ready

3.1. Classrooms are to be on a network separate from departmental or faculty networks within the building. This network is commonly referred to as “Classnet.”

3.2. Room internet is via wireless. [http://wireless.utoronto.ca](http://wireless.utoronto.ca)

3.3. Each Wireless Access Point requires 2 CAT6 connections to the telecom closet. Refer to UTM Communications Cabling Standard and UTM IITS Department for current wireless access point specification.

3.4. Hard-wired CAT6 connections from the teaching station to the network closet required as follows:

- **3.4.1. (4) Classnet network connections:** control processor / authentication, VOIP intercom, Touch Screen, Audio Stream
- **3.4.2. (4) Internet connections:** podium P.C., guest laptop, Airmedia or equivalent device, webcasting / streaming station.
- **3.4.3. (1) data connection required in ceiling for I.P. Camera**

3.5. For 200+ tiered classrooms, a floor monument on each tier should be included to facilitate videoconferencing and back of the room a/v control.

3.5.1. **Floor Monument shall be a covered recessed cavity containing the following connections:**
- **3.5.1.1. One duplex AC power receptacle**
- **3.5.1.2. Two network connections (Internet / Classnet) terminating in the network communications closet.**
- **3.5.1.3. Three video lines, two duplicating the display devices signals (projectors) and one source input, carried over category 6 shielded twisted pair cable terminating at the video routing equipment.**
- **3.5.1.4. Three balanced --audio lines (program, microphone and source in) carried over shielded three conductor audio cable terminating at the audio routing equipment.**

### Fully ALC

3.1. Classrooms are to be on a network separate from departmental or faculty networks within the building. This network is commonly referred to as “Classnet.”

3.2. Room internet is via wireless. [http://wireless.utoronto.ca](http://wireless.utoronto.ca)

3.3. Each Wireless Access Point requires 2 CAT6 connections to the telecom closet. Refer to UTM Communications Cabling Standard and UTM IITS Department for current wireless access point specification.

3.4. Hard-wired CAT6 connections from the ALC teaching station to the network closet required as follows:

- **3.4.1. (4) Classnet network connections:** control processor / authentication, VOIP intercom, Touch Screen, Audio Stream
- **3.4.2. (4) Internet connections:** podium P.C., guest laptop, Airmedia or equivalent device, webcasting / streaming station.
- **3.4.4. (2) minimum data connections required in ceiling for presentation cameras**

3.5. Data in wall for each potential student table of 6 depending on size of room

- **3.5.1. (2) data for Internet connection**
- **3.5.1.1. (1) for Internet connection for airmedia device**
- **3.5.1.2. (1) for connection to ALC TS**

### 4. AUDIO VISUAL

4.1. Audio Visual specifics are to be listed in the room data sheets. All classrooms are to be equipped to allow the presentation of audio and graphic content generated from digital computing devices.

4.2. Audio Visual requirements as per classroom capacity:

- **4.2.1. Classroom capacity 25-49 seats:** Standard A/V control platform is the UTM Compact Teaching Station (CTS). (see [Appendix A](#) for list of main CTS components) equipped with a desktop computer and document camera. Rooms include built-in AV equipment and sources.

4.1. Audio Visual specifics are to be listed in the room data sheets. All classrooms are to be equipped to allow the presentation of audio and graphic content generated from digital computing devices.

4.2. Audio Visual requirements as per classroom capacity:

- **4.2.1. Classroom capacity 25-49 seats:** Standard A/V control platform is the UTM Compact Teaching Station (CTS). (see [Appendix A](#) for list of main CTS components) equipped with a desktop computer and document camera. Rooms include built-in AV equipment and sources.

4.1. Audio Visual specifics are to be listed in the room data sheets. All classrooms are to be equipped to allow the presentation of audio and graphic content generated from digital computing devices.

4.2. Audio Visual requirements for ALCs are dependent on the classroom capacity and the number of active learning student tables.
4.4. The digital projection image shall have a 16:10 aspect ratio.

4.3. Minimum Digital data projector brightness:

- **25-40 seat:** 4200 lumens
- **40-150 seats:** 5500 lumens
- **150-490 seats:** 7000 Lumens

4.3.5. Minimum Resolution: 1280 X 800 (WXGA)

4.3.6. Minimum Contrast Ratio: 2000:1

4.2.3.1. The dual-projector feature allows instructors to show different source material on the two screens (i.e. document camera on projector 1, laptop on projector 2), or have the displays mirrored – showing the same source. For ease of use, projectors are labelled with large number “1” and “2” decals visible from the podium, so that the instructors know which one will display the intended materials. The dual-projector feature is only implemented in rooms with applicable layout. All seats must fall into the optimal viewing angle for both displays. If the front wall is too narrow, a single-projector version of the FTS will be implemented.

4.2.4. Classrooms 200+ are to be outfitted with a confidence monitor per ceiling mounted projector.

4.3. Minimum Digital data projector brightness:

- **25-40 seat:** 4200 lumens
- **40-150 seats:** 5500 Lumens
- **150-490 seats:** 7000 Lumens

4.3.5. Minimum Resolution: 1280 X 800 (WXGA)

4.3.6. Minimum Contrast Ratio: 2000:1

4.4. The digital projection image shall have a 16:10 aspect ratio and conform to the InfoComm standard “1/6th requirement,” meaning that the height of the screen must be no shorter than 1/6th of the distance from the screen to the furthest seat in the classroom.

Appendix “A” for list of main CTS components) equipped with a desktop computer and document camera. Rooms include built-in equipment consisting of electrically operated projection screen, ceiling-mounted digital projector, audio system including wall or ceiling mounted speakers. The audio system need only be used for program (PC) audio; no microphones are in the Small Classroom Standard unless the layout requires voice reinforcement.

4.2.2. Classroom 50+ capacity: Standard A/V control platform is the UTM Full Teaching Station (FTS) (see Appendix “B” for list of main FTS components) equipped with a desktop computer and document camera. Rooms include built-in equipment consisting of electrically operated projection screen, ceiling-mounted digital projector, wall or ceiling mounted speakers and assistive listening audio transmitter.

4.2.3. Classrooms 100+ are to be outfitted with two ceiling mounted digital projectors, two screens and the standard A/V control platform, the UTM Full Teaching Stations (see Appendix “B”) equipped with a desktop computer and document camera. Rooms include built-in equipment consisting of 2 electrically operated projection screens, 2 ceiling-mounted digital projectors, wall or ceiling mounted speakers and assistive listening audio transmitter.

4.3. Classroom 200+ are to be outfitted with one confidence monitor per ceiling mounted projector.

4.3. Minimum Digital data projector brightness:

- **25-40 seat:** 4200 lumens
- **40-150 seats:** 5500 Lumens
- **150-490 seats:** 7000 Lumens

4.3.5. Minimum Resolution: 1280 X 800 (WXGA)

4.3.6. Minimum Contrast Ratio: 2000:1

4.4. The digital projection image shall have a 16:10 aspect ratio and conform to the InfoComm standard “1/6th requirement,” meaning that the height of the screen must be no shorter than 1/6th of the distance from the screen to the furthest seat in the classroom.
4.5. All student seating should fall within the viewing cone and be no closer to the screen than the width of the image. Screen location to leave minimum 6’ blackboard with screen down, prefer 8’ or more.

4.6. Screens for projection are required in all classrooms except where it has been deemed preferable to project onto the wall surface.

4.6.1. An electrically operated, tensioned screen with unity gain and a matte white surface shall be used in all rooms when a digital projector will be employed for presentation of graphical and video content. The screen should have integrated low voltage control and a wall mounted auxiliary over-ride switch, located on the wall nearest to the Teaching Station. Suggested typical screen, Draper 101640L Tensioned Projection screen, Electric w/ low voltage control, 16:10, Matt-white.

4.6.2. The electric screen must accept low-voltage D.C. to be controlled by the FTS touchscreen interface.

4.6.3. In larger rooms, if possible, it is preferred to delete the screen and to project onto the wall above the blackboard. The wall should be carefully prepared for surface quality and coated with "screen paint".

4.6.4. Architect should provide simple room front drawings showing location of image with dimensions showing clear ceiling height, image size and distance from floor.

4.6.5. Typically the screen is offset to one or both sides to allow maximum available blackboard with screen down (minimum 6’ wide of visible blackboard with screen down, 8’ is preferred).

4.7. Video inputs should be provided for VGA (analog RGBHV) and HDMI (or digital DVI).

4.8. Audio in classrooms is to be addressed through wall or ceiling mounted speakers to be installed in any room equipped with projection equipment to allow for the audio content. The Large Classroom standard (50+) requires that the audio system be comprised of ceiling mounted speakers configured in an overlap pattern suitable for the seating layout, and that the wattage of said system be powerful enough to satisfy the demands of the program audio and voice reinforcement in accordance with the room’s size, layout, and composition of building materials.

4.8.1. Speakers at the front of the room must be located a minimum 6’ from the front wall to prevent audio feedback loop when the instructor is using a microphone (i.e. mount speakers forward of where the micro phone presenter is located).

4.8.2. A dry-contact connection to the fire alarm system shall be provided at the audio amplifier location to allow for muting of the classroom audio when fire alarms are active.

4.8.3. 200+ classrooms are to be outfitted with stereo speakers that the height of the screen must be no shorter than 1/6th of the distance from the screen to the furthest seat in the classroom.

4.5. All student seating should fall within the viewing cone and be no closer to the screen than the width of the image. Screen location to leave minimum 6’ blackboard with screen down, prefer 8’ or more.

4.6. Screens for projection are required in all classrooms except where it has been deemed preferable to project onto the wall surface.

4.6.1. An electrically operated, tensioned screen with unity gain and a matte white surface shall be used in all rooms when a digital projector will be employed for presentation of graphical and video content. The screen should have integrated low voltage control and a wall mounted auxiliary over-ride switch, located on the wall nearest to the Teaching Station. Suggested typical screen, Draper 101640L Tensioned Projection screen, Electric w/ low voltage control, 16:10, Matt-white.

4.6.2. The electric screen must accept low-voltage D.C. to be controlled by the FTS touchscreen interface.

4.6.3. In larger rooms, if possible, it is preferred to delete the screen and to project onto the wall above the blackboard. The wall should be carefully prepared for surface quality and coated with "screen paint".

4.6.4. Architect should provide simple room front drawings showing location of image with dimensions showing clear ceiling height, image size and distance from floor.

4.6.5. Typically the screen is offset to one or both sides to allow maximum available blackboard with screen down (minimum 6’ wide of visible blackboard with screen down, 8’ is preferred).

4.7. Video inputs should be provided for VGA (analog RGBHV) and HDMI (or digital DVI).

4.8. Audio in classrooms is to be addressed through wall or ceiling mounted speakers to be installed in any room equipped with projection equipment to allow for the audio content. The Large Classroom standard (50+) requires that the audio system be comprised of ceiling mounted speakers configured in an overlap pattern suitable for the seating layout, and that the wattage of said system be powerful enough to satisfy the demands of the program audio and voice reinforcement in accordance with the room’s size, layout, and composition of building materials.

4.8.1. Speakers at the front of the room must be located a minimum 6’ from the front wall to prevent audio feedback loop when the instructor is using a microphone (i.e. mount speakers forward of where the micro phone presenter is located).

4.8.2. A dry-contact connection to the fire alarm system shall be provided at the audio amplifier location to allow for muting of the classroom audio when fire alarms are active.

4.8.3. 200+ classrooms are to be outfitted with stereo speakers that the height of the screen must be no shorter than 1/6th of the distance from the screen to the furthest seat in the classroom.

4.7.1. Pan/Tilt/Zoom (PTZ) Camera Specifications:

4.7.1.1. Image sensor minimum 720p resolution (1280X720)

4.7.1.2. Wide dynamic range technology with auto focus/iris/shutter

4.7.1.3. 12X optical zoom or better

4.7.1.4. Minimum 4 pre-set positions

4.7.1.5. Support dual streams with the following formats H.264, MPEG-4, JPEG

4.7.1.6. Supports audio input and encoding

4.7.1.7. POE power capable

<table>
<thead>
<tr>
<th>Traditional</th>
<th>ALC Ready</th>
<th>Fully ALC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.5. All student seating should fall within the viewing cone and be no closer to the screen than the width of the image. Screen location to leave minimum 6’ blackboard with screen down, prefer 8’ or more.</td>
<td>4.5. All student seating should fall within the viewing cone and be no closer to the screen than the width of the image. Screen location to leave minimum 6’ blackboard with screen down, prefer 8’ or more.</td>
<td>component of the classroom support and should be located on the rear wall of the classrooms.</td>
</tr>
<tr>
<td>4.6. Screens for projection are required in all classrooms except where it has been deemed preferable to project onto the wall surface.</td>
<td>4.6. Screens for projection are required in all classrooms except where it has been deemed preferable to project onto the wall surface.</td>
<td>4.7.1. Pan/Tilt/Zoom (PTZ) Camera Specifications:</td>
</tr>
<tr>
<td>4.6.1. An electrically operated, tensioned screen with unity gain and a matte white surface shall be used in all rooms when a digital projector will be employed for presentation of graphical and video content. The screen should have integrated low voltage control and a wall mounted auxiliary over-ride switch, located on the wall nearest to the Teaching Station. Suggested typical screen, Draper 101640L Tensioned Projection screen, Electric w/ low voltage control, 16:10, Matt-white.</td>
<td>4.6.1. An electrically operated, tensioned screen with unity gain and a matte white surface shall be used in all rooms when a digital projector will be employed for presentation of graphical and video content. The screen should have integrated low voltage control and a wall mounted auxiliary over-ride switch, located on the wall nearest to the Teaching Station. Suggested typical screen, Draper 101640L Tensioned Projection screen, Electric w/ low voltage control, 16:10, Matt-white.</td>
<td>4.7.1.1. Image sensor minimum 720p resolution (1280X720)</td>
</tr>
<tr>
<td>4.6.2. The electric screen must accept low-voltage D.C. to be controlled by the FTS touchscreen interface.</td>
<td>4.6.2. The electric screen must accept low-voltage D.C. to be controlled by the FTS touchscreen interface.</td>
<td>4.7.1.2. Wide dynamic range technology with auto focus/iris/shutter</td>
</tr>
<tr>
<td>4.6.3. In larger rooms, if possible, it is preferred to delete the screen and to project onto the wall above the blackboard. The wall should be carefully prepared for surface quality and coated with “screen paint”.</td>
<td>4.6.3. In larger rooms, if possible, it is preferred to delete the screen and to project onto the wall above the blackboard. The wall should be carefully prepared for surface quality and coated with “screen paint”.</td>
<td>4.7.1.3. 12X optical zoom or better</td>
</tr>
<tr>
<td>4.6.4. Architect should provide simple room front drawings showing location of image with dimensions showing clear ceiling height, image size and distance from floor.</td>
<td>4.6.4. Architect should provide simple room front drawings showing location of image with dimensions showing clear ceiling height, image size and distance from floor.</td>
<td>4.7.1.4. Minimum 4 pre-set positions</td>
</tr>
<tr>
<td>4.6.5. Typically the screen is offset to one or both sides to allow maximum available blackboard with screen down (minimum 6’ wide of visible blackboard with screen down, 8’ is preferred).</td>
<td>4.6.5. Typically the screen is offset to one or both sides to allow maximum available blackboard with screen down (minimum 6’ wide of visible blackboard with screen down, 8’ is preferred).</td>
<td>4.7.1.5. Support dual streams with the following formats H.264, MPEG-4, JPEG</td>
</tr>
<tr>
<td>4.7. Video inputs should be provided for VGA (analog RGBHV) and HDMI (or digital DVI).</td>
<td>4.7. Video inputs should be provided for VGA (analog RGBHV) and HDMI (or digital DVI).</td>
<td>4.7.1.6. Supports audio input and encoding</td>
</tr>
<tr>
<td>4.8. Audio in classrooms is to be addressed through wall or ceiling mounted speakers to be installed in any room equipped with projection equipment to allow for the audio content. The Large Classroom standard (50+) requires that the audio system be comprised of ceiling mounted speakers configured in an overlap pattern suitable for the seating layout, and that the wattage of said system be powerful enough to satisfy the demands of the program audio and voice reinforcement in accordance with the room’s size, layout, and composition of building materials.</td>
<td>4.8. Audio in classrooms is to be addressed through wall or ceiling mounted speakers to be installed in any room equipped with projection equipment to allow for the audio content. The Large Classroom standard (50+) requires that the audio system be comprised of ceiling mounted speakers configured in an overlap pattern suitable for the seating layout, and that the wattage of said system be powerful enough to satisfy the demands of the program audio and voice reinforcement in accordance with the room’s size, layout, and composition of building materials.</td>
<td>4.7.1.7. POE power capable</td>
</tr>
<tr>
<td>4.8.1. Speakers at the front of the room must be located a minimum 6’ from the front wall to prevent audio feedback loop when the instructor is using a microphone (i.e. mount speakers forward of where the micro phone presenter is located).</td>
<td>4.8.1. Speakers at the front of the room must be located a minimum 6’ from the front wall to prevent audio feedback loop when the instructor is using a microphone (i.e. mount speakers forward of where the micro phone presenter is located).</td>
<td></td>
</tr>
<tr>
<td>4.8.2. A dry-contact connection to the fire alarm system shall be provided at the audio amplifier location to allow for muting of the classroom audio when fire alarms are active.</td>
<td>4.8.2. A dry-contact connection to the fire alarm system shall be provided at the audio amplifier location to allow for muting of the classroom audio when fire alarms are active.</td>
<td></td>
</tr>
<tr>
<td>4.8.3. 200+ classrooms are to be outfitted with stereo speakers that the height of the screen must be no shorter than 1/6th of the distance from the screen to the furthest seat in the classroom.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S:\STANDARDS\Sana WORKING Files\_UTM Standards Kit\_UTM-STNDs_Spaces\ALC Std\ITS Part2\ClassroomDesignCriteriaStd_Part2-ITS_150618.docx

6/13
5. **TEACHING STATIONS (TS)**

5.1. Specifications and information for these 2 standard AV presentation stations are available in the Appendices “A” and “B”. They are standard products built for UTM based on specifications from the IITS department at the University of Toronto Mississauga, and are based heavily on the UofT Classroom Standards. The FTS itself is a custom millwork wooden lectern containing all of the various components required for the normal operation of the classroom. UTM will be responsible for the procurement and specification of the podium millwork. There will inevitably be minor changes to the millwork cutouts as compared to the link below; UTM will obtain the as-built podium drawings from the millworker and provide these to the installer. Please see http://sites.utoronto.ca/teachingstation/architect.html for a comprehensive list of plans, specs and dimensions pertaining to the FTS and installation. Please refer to these plans for orienting AV components and millwork within classrooms, as well as conduit and cabling location in the construction phase. Please note that some specifics may be superseded by UTM specific requirements. Please refer to this specification and contact UTM IITS.

5.2. The UTM Full Teaching Station (classrooms capacity 50+) is essentially a fixed podium 2'6W x 2'6D x 42"H located 5'+ feet from the front wall, usually to one side of the projection screen. The Station itself does not obstruct the screen or blackboard. The Station will be a fixed podium located centrally in the middle of the ALC and is therefore considered a fixed equipment. UTM will be responsible for the procurement and specification of the podium millwork. There will inevitably be minor changes to the millwork cutouts as compared to the link below; UTM will obtain the as-built podium drawings from the millworker and provide these to the installer. Please see http://sites.utoronto.ca/teachingstation/architect.html for a comprehensive list of plans, specs and dimensions pertaining to the FTS and installation. Please refer to these plans for orienting AV components and millwork within classrooms, as well as conduit and cabling location in the construction phase. Please note that some specifics may be superseded by UTM specific requirements. Please refer to this specification and contact UTM IITS.

5.3. The UTM Full Teaching Station (classrooms capacity 200+) are to be outfitted with stereo speakers and contain similar audio visual and classroom technology components as the UTM Full Teaching Station with additional functionality to interact with the video signal(s) which often have a lengthy cable run to the projector. (see Appendix C)

5.4. The UTM Full Teaching Station (classrooms capacity 50+) is essentially a fixed podium 2'6W x 2'6D x 42"H located 5'+ feet from the front wall, usually to one side of the projection screen. The Station itself does not obstruct the screen or blackboard. The Station will be a fixed podium located centrally in the middle of the ALC and is therefore considered a fixed equipment. UTM will be responsible for the procurement and specification of the podium millwork. There will inevitably be minor changes to the millwork cutouts as compared to the link below; UTM will obtain the as-built podium drawings from the millworker and provide these to the installer. Please see http://sites.utoronto.ca/teachingstation/architect.html for a comprehensive list of plans, specs and dimensions pertaining to the FTS and installation. Please refer to these plans for orienting AV components and millwork within classrooms, as well as conduit and cabling location in the construction phase. Please note that some specifics may be superseded by UTM specific requirements. Please refer to this specification and contact UTM IITS.

5.5. The UTM Full Teaching Station (classrooms capacity 200+) are to be outfitted with stereo speakers and contain similar audio visual and classroom technology components as the UTM Full Teaching Station with additional functionality to interact with the video signal(s) which often have a lengthy cable run to the projector. (see Appendix C)
Traditional

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.2.1. The FTS contains a PC, Crestron processor, Crestron Touchscreen for user interaction, breakout cables for portable devices VGA + audio, HDMI and wired Ethernet, flexible podium microphone, cabinet for wireless Lavaliere microphone, input plate with 4 USB ports, composite video/audio, and 3.5mm audio lineout connections, audio amplifier, video switching / processing hardware, and transmission hardware for the video signal(s) which often have a lengthy cable run to the projector.</td>
<td>TS uses a conduit connection through the floor and so is fixed equipment. See Appendix &quot;B&quot;.</td>
</tr>
<tr>
<td>5.3. The UTM Compact Teaching Station (classrooms capacity 25-49) is fixed smaller version of the standard podium 2W x 2D x 36'H located 5' + feet from the front wall, usually to one side of the projection screen. The Station itself does not obstruct the screen or blackboard. The TS uses a conduit connection through the floor and so is fixed equipment. See Appendix &quot;A&quot;.</td>
<td>TS uses a conduit connection through the floor and so is fixed equipment. See Appendix &quot;B&quot;.</td>
</tr>
<tr>
<td>5.4.1. Prevent access to control menus until user is authenticated</td>
<td>5.4.2. Allow source selection for two independent display devices</td>
</tr>
<tr>
<td>5.4.2. Allow source selection for two independent display devices</td>
<td>5.4.3. Provide sub-menus for individual device control (projector, DVD, document camera, etc.)</td>
</tr>
<tr>
<td>5.4.3. Provide sub-menus for individual device control (projector, DVD, document camera, etc.)</td>
<td>5.4.4. Provide control of audio levels independently for fixed and wireless microphones and program audio</td>
</tr>
<tr>
<td>5.4.4. Cabling bundling must be done using removable Velcro ties to power all A/V equipment and protect it from power spikes/surges.</td>
<td>5.4.7. Allow unlocking of cabinet doors</td>
</tr>
<tr>
<td>5.4.5. Provide control of room lighting levels if room is equipped for lighting level control</td>
<td>5.4.6. All Podium PCs must fit physically inside the millwork of their respective podiums. Minimum specs for the Podium PCs are available from UTM IITS.</td>
</tr>
<tr>
<td>5.4.6. Provide ability to remotely control the equipment over standard network connection</td>
<td>5.4.7. Any switches that must be installed any TS must be UTM provided managed network switches. Other networking equipment must not be used without explicit approval from IITS.</td>
</tr>
<tr>
<td>5.4.7. Allow unlocking of cabinet doors</td>
<td>5.3. Teaching Stations are controlled through a Crestron touch panel using a standardized graphical user interface that provides the following functionality:</td>
</tr>
<tr>
<td>5.3.1. The button panel on the Compact Teaching Station has basic controls for System On, System Off, VGA and HDMI source selection, screen and volume controls, and audio / video mute. There are breakout cables for portable device VGA + audio, HDMI and wired Ethernet. The input plate to the right of the button panel has similar connections to the FST; four USB ports, composite audio and video, as well as 3.5 mm audio in for mobile devices</td>
<td>5.3.2. Allow source selection for multiple independent display devices</td>
</tr>
<tr>
<td>5.3.2. Allow source selection for multiple independent display devices</td>
<td>5.3.3. Provide sub-menus for individual device control (projector, DVD, document camera, etc.)</td>
</tr>
<tr>
<td>5.3.3. Provide sub-menus for individual device control (projector, DVD, document camera, etc.)</td>
<td>5.3.4. Provide control of audio levels independently for fixed and wireless microphones and program audio</td>
</tr>
<tr>
<td>5.3.4. Provide control of audio levels independently for fixed and wireless microphones and program audio</td>
<td>5.3.5. Provide control of room lighting levels if room is equipped for lighting level control</td>
</tr>
<tr>
<td>5.3.5. Provide control of room lighting levels if room is equipped for lighting level control</td>
<td>5.3.6. Provide ability to remotely control the equipment over standard network connection</td>
</tr>
<tr>
<td>5.3.6. Provide ability to remotely control the equipment over standard network connection</td>
<td>5.3.7. Allow unlocking of cabinet doors</td>
</tr>
<tr>
<td>5.3.7. Allow unlocking of cabinet doors</td>
<td>5.4.1. Prevent access to control menus until user is authenticated</td>
</tr>
<tr>
<td>5.4.1. Prevent access to control menus until user is authenticated</td>
<td>5.4.2. Allow source selection for two independent display devices</td>
</tr>
<tr>
<td>5.4.2. Allow source selection for two independent display devices</td>
<td>5.4.3. Provide sub-menus for individual device control (projector, DVD, document camera, etc.)</td>
</tr>
<tr>
<td>5.4.3. Provide sub-menus for individual device control (projector, DVD, document camera, etc.)</td>
<td>5.4.4. Provide control of audio levels independently for fixed and wireless microphones and program audio</td>
</tr>
<tr>
<td>5.4.4. Provide control of audio levels independently for fixed and wireless microphones and program audio</td>
<td>5.4.5. Provide control of room lighting levels if room is equipped for lighting level control</td>
</tr>
<tr>
<td>5.4.5. Provide control of room lighting levels if room is equipped for lighting level control</td>
<td>5.4.6. Provide ability to remotely control the equipment over standard network connection</td>
</tr>
<tr>
<td>5.4.6. Provide ability to remotely control the equipment over standard network connection</td>
<td>5.4.7. Allow unlocking of cabinet doors</td>
</tr>
<tr>
<td>Traditional</td>
<td>ALC Ready</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>6.5. Podium Installation Instructions: All wiring must be neat and tidy</td>
<td>6.5. Podium Installation Instructions: All wiring must be neat and tidy</td>
</tr>
<tr>
<td>inside the podium, cabinet or behind wall mounted displays.</td>
<td>inside the podium, cabinet or behind wall mounted displays.</td>
</tr>
<tr>
<td>5.5.1. All cabling must be meticulously labeled using printed labels.</td>
<td>5.5.1. All cabling must be meticulously labeled using printed labels.</td>
</tr>
<tr>
<td>Hand printed labels will not be accepted.</td>
<td>Hand printed labels will not be accepted.</td>
</tr>
<tr>
<td>5.5.2. Cabling bundling must be done using removable Velcro ties and never</td>
<td>5.5.2. Cabling bundling must be done using removable Velcro ties and never</td>
</tr>
<tr>
<td>plastic zip-ties.</td>
<td>plastic zip-ties.</td>
</tr>
<tr>
<td>5.5.3. When possible, especially for the FTS, cable management</td>
<td>5.5.3. When possible, especially for the FTS, cable management</td>
</tr>
<tr>
<td>laneways are required.</td>
<td>laneways are required.</td>
</tr>
<tr>
<td>5.5.4. A/V supplier must provide any surge protection bars required to</td>
<td>5.5.4. A/V supplier must provide any surge protection barsrequired to</td>
</tr>
<tr>
<td>power all A/V equipment and protect it from power spikes/surges.</td>
<td>power all A/V equipment and protect it from power spikes/surges.</td>
</tr>
<tr>
<td>5.5.5. Cooling fans must be installed on each side of the podium to</td>
<td>5.5.5. Cooling fans must be installed on each side of the podium to</td>
</tr>
<tr>
<td>ensure proper operating temperature of the equipment.</td>
<td>ensure proper operating temperature of the equipment.</td>
</tr>
<tr>
<td>5.5.6. All Podium PCs must fit physically inside the millwork of their</td>
<td>5.5.6. All Podium PCs must fit physically inside the millwork of their</td>
</tr>
<tr>
<td>respective podiums. Minimum specs for the Podium PCs are available from</td>
<td>respective podiums. Minimum specs for the Podium PCs are available from</td>
</tr>
<tr>
<td>UTM IITS.</td>
<td>UTM IITS.</td>
</tr>
<tr>
<td>5.5.7. Any switches that must be installed in FTS or Compact TS must be</td>
<td>5.5.7. Any switches that must be installed in FTS or Compact TS must be</td>
</tr>
<tr>
<td>UTM provided managed network switches. Other networking equipment must</td>
<td>UTM provided managed network switches. Other networking equipment must</td>
</tr>
<tr>
<td>not be used without explicit approval from IITS.</td>
<td>not be used without explicit approval from IITS.</td>
</tr>
<tr>
<td>5.5.8. All technical drawings shall be provided including cable and</td>
<td>5.5.8. All technical drawings shall be provided including cable and</td>
</tr>
<tr>
<td>equipment labeling as per installation.</td>
<td>equipment labeling as per installation.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>6. CLASSROOM SUPPORT TECHNOLOGY</td>
<td>6.1. Classroom support is accomplished from a central support console by</td>
</tr>
<tr>
<td></td>
<td>monitoring audio, video and digital control information derived from the</td>
</tr>
<tr>
<td></td>
<td>classroom systems.</td>
</tr>
<tr>
<td>6.1. Classroom support is accomplished from a central support console by</td>
<td>6.1. Communication with the user is accomplished by a voice over internet</td>
</tr>
<tr>
<td>monitoring audio, video and digital control information derived from the</td>
<td>protocol (VOIP) intercom or handset. Standard TCP/IP network shall be used</td>
</tr>
<tr>
<td>classroom systems.</td>
<td>to connect devices.</td>
</tr>
<tr>
<td>6.2. Communication with the user is accomplished by a voice over internet</td>
<td>6.2. A standard PTZ security camera will provide support personnel with a</td>
</tr>
<tr>
<td>protocol (VOIP) intercom or handset. Standard TCP/IP network shall be used</td>
<td>real-time view of classroom and client conditions. Standard TCP/IP network</td>
</tr>
<tr>
<td>to connect devices.</td>
<td>shall be used to connect devices.</td>
</tr>
<tr>
<td>6.3. A standard PTZ security camera will provide support personnel with</td>
<td>6.3. Creston control protocols are used to control and monitor the</td>
</tr>
<tr>
<td>a real-time view of classroom and client conditions. Standard TCP/IP</td>
<td>classroom electronic systems. Creston Fusion / Roomview provides</td>
</tr>
<tr>
<td>network shall be used to connect devices.</td>
<td>continuous information about the equipment status and econtrol / Xpanel</td>
</tr>
<tr>
<td></td>
<td>is used to provide the remote support personnel the ability to control the</td>
</tr>
<tr>
<td></td>
<td>the ability to control the rooms systems.</td>
</tr>
<tr>
<td>6.4.1. The Creston Roomview Server module must be coded onto all</td>
<td>6.4.1. The Creston Roomview Server module must be coded onto all</td>
</tr>
<tr>
<td>processors for the FTS, Compact TS, and meeting room control panels as</td>
<td>processors for the FTS, Compact TS, and meeting room control panels as</td>
</tr>
<tr>
<td>per guidelines available from UTM IITS.</td>
<td>per guidelines available from UTM IITS.</td>
</tr>
</tbody>
</table>
### Traditional

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4.2.</td>
<td>Processor and Server IPs will be provided by UTM IITS.</td>
</tr>
<tr>
<td>6.4.3.</td>
<td>eControl (Xpanel) functionality to work in conjunction with Roomview Server must be coded onto the processor by the AV installer and must visually resemble the standard Crestron GUI for the teaching stations.</td>
</tr>
</tbody>
</table>

#### 6.5. Programming Code Ownership (e.g. Crestron)

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5.1.</td>
<td>Existing un-compiled control code used on similar set ups elsewhere on campus, will be made available to the contractor upon contractor’s request.</td>
</tr>
<tr>
<td>6.5.2.</td>
<td>The contractor will provide final un-compiled code to UTM after implementation.</td>
</tr>
<tr>
<td>6.6.</td>
<td>All support operations and user authentication takes place over standard TCP/IP networks supplied and maintained by the campus Instructional and Information Technology Service group.</td>
</tr>
</tbody>
</table>

### ALC Ready

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4.2.</td>
<td>Processor and Server IPs will be provided by UTM IITS.</td>
</tr>
<tr>
<td>6.4.3.</td>
<td>eControl (Xpanel) functionality to work in conjunction with Roomview Server must be coded onto the processor by the AV installer and must visually resemble the standard Crestron GUI for the teaching stations.</td>
</tr>
</tbody>
</table>

#### 6.5. Programming Code Ownership (e.g. Crestron)

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5.1.</td>
<td>Existing un-compiled control code used on similar set ups elsewhere on campus, will be made available to the contractor upon contractor’s request.</td>
</tr>
<tr>
<td>6.5.2.</td>
<td>The contractor will provide final un-compiled code to UTM after implementation.</td>
</tr>
<tr>
<td>6.6.</td>
<td>All support operations and user authentication takes place over standard TCP/IP networks supplied and maintained by the campus Instructional and Information Technology Service group.</td>
</tr>
</tbody>
</table>

### Fully ALC

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4.2.</td>
<td>Processor and Server IPs will be provided by UTM IITS.</td>
</tr>
<tr>
<td>6.4.3.</td>
<td>eControl (Xpanel) functionality to work in conjunction with Roomview Server must be coded onto the processor by the AV installer and must visually resemble the standard Crestron GUI for the teaching stations.</td>
</tr>
</tbody>
</table>

#### 6.5. Programming Code Ownership (e.g. Crestron)

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5.1.</td>
<td>Existing un-compiled control code used on similar set ups elsewhere on campus, will be made available to the contractor upon contractor’s request.</td>
</tr>
<tr>
<td>6.5.2.</td>
<td>The contractor will provide final un-compiled code to UTM after implementation.</td>
</tr>
<tr>
<td>6.6.</td>
<td>All support operations and user authentication takes place over standard TCP/IP networks supplied and maintained by the campus Instructional and Information Technology Service group.</td>
</tr>
</tbody>
</table>

---

**econtrol / Xpanel** is used to provide the remote support personnel the ability to control the rooms systems.  
6.4.1. The Crestron Roomview Server module must be coded onto all processors for the FTS, Compact TS, ALC TS, and meeting room control panels as per guidelines available from UTM IITS.  
6.4.2. Processor and Server IPs will be provided by UTM IITS.  
6.4.3. eControl (Xpanel) functionality to work in conjunction with Roomview Server must be coded onto the processor by the AV installer and must visually resemble the standard Crestron GUI for the teaching stations.  
6.5.1. Existing un-compiled control code used on similar set ups elsewhere on campus, will be made available to the contractor upon contractor’s request.  
6.5.2. The contractor will provide final un-compiled code to UTM after implementation.  
6.6. All support operations and user authentication takes place over standard TCP/IP networks supplied and maintained by the campus Instructional and Information Technology Service group.  

---

**econtrol / Xpanel** is used to provide the remote support personnel the ability to control the rooms systems.  
6.4.1. The Crestron Roomview Server module must be coded onto all processors for the FTS, Compact TS, ALC TS, and meeting room control panels as per guidelines available from UTM IITS.  
6.4.2. Processor and Server IPs will be provided by UTM IITS.  
6.4.3. eControl (Xpanel) functionality to work in conjunction with Roomview Server must be coded onto the processor by the AV installer and must visually resemble the standard Crestron GUI for the teaching stations.  
6.5.1. Existing un-compiled control code used on similar set ups elsewhere on campus, will be made available to the contractor upon contractor’s request.  
6.5.2. The contractor will provide final un-compiled code to UTM after implementation.  
6.6. All support operations and user authentication takes place over standard TCP/IP networks supplied and maintained by the campus Instructional and Information Technology Service group. 

---

_**econtrol / Xpanel** is used to provide the remote support personnel the ability to control the rooms systems._
## Appendix A
### UTM Compact Teaching Station

**University of Toronto Mississauga Compact Electronic Podium**

**Use**
- Standard equipment for classrooms capacity 25 - 49
- Controls data projector(s), and room audio system
- Controls lighting and screen raise/lower
- Internet connection and UofT UTORid log-in
- Designed for instructor to stand either at front or at side of unit

**Equipment**
- Crestron processor and automation must integrate with Fusion RoomView monitoring processes
- Unit supplied by UTM – installed/fixed to floor
- Touch-Screen for room AV controls
- On-board computer & keyboard (to be supplied by UofT)
- Wired internet connection
- Reading light
- VoIP handset for AV contact
- Wireless microphone
- Fixed arm microphone
- 4x USB in connection to computer
- VGA/HDMI cable for connection to laptop computer
- Audio cable - headphone mini-jack
- Wireless audio/video connectivity for mobile devices from ANY/EVERY platform
- Pull-out side table (2)
- Power outlets (2)
- Fans (2)
- Audio volume control (room amplifier inside unit or external)
- Audio/Video source selector (Crestron)
- Monitor/touch screen for computer on articulating arm
- Document camera

*Contractor's proposed equipment list will be subject to UTM Approval*

**Conduit Feed**
- Conduit feed is through the floor, feeding into the empty base of the unit.
- Ideal feed is ballast box located 6” within outside edge of unit (shown)
- Ideal feed is flush with floor, maximum protrusion is 1.5’ above flush
- Flush mount standard terminations are preferred to floor monuments with custom/proprietary connections
- Feed includes data & power in ballast box with standard plug-in connectors (i.e. conduit feed is a finished connection point with A/C and network plugs for UofT to plug into when installing Teaching Station at project completion)

**Typical Conduit Requirements**
- Actual requirements TBD by project, no conduits to be more than 20% fill
  - 2x Quadplex power - to power computer etc. and to connect to 2 external side duplex
  - to video projector - video feed, control cable, CAT6 computer cable
  - to lighting controls - digital Crestron control
  - to Network box - network CAT6 x 8 (refer to UTM Communications Cabling standard)
  - to speakers - from amp located inside Teaching Station
  - to left corner of screen - for screen raise/lower control

**Position**
- Located to one side of screen so professor does not block view of screen

**Size (approximate)**
- 2’ x 2’ footprint
- Unit height 36”
- Front retractable shelf 30” from floor
Appendix B

UTM Full Teaching Station

University of Toronto Mississauga Standard Electronic Podium

Use
Standard equipment for classrooms over 50 capacity
Controls data projector(s), confidence monitor, and room microphone / audio system
Controls lighting and projection screen raise/lower
Internet connection and UofT UTORid log-in
Stand for notes etc.

Equipment
Crestron processor and automation must integrate with Fusion RoomView monitoring processes
Unit supplied by UTM – installed/fixed to floor
Touch-Screen for room AV controls
On-board computer & keyboard (to be supplied by UofT)
Wired internet connection
Reading light
VoIP handset for AV contact
Wired internet connection
Fixed arm microphone
Audio volume control (room amplifier inside unit or external)
Audio/Video source selector (Crestron)
Document camera

"Contractor's proposed equipment list will be subject to UTM Approval"

Size (approximate)
2'6 x 2'6 footprint
Unit height 42”
Fixed shelf 36” from floor
Retractable shelves 30” from floor extending 24” out from each side

Position
DISTANCE FROM PRESENTATION WALL TO TEACHING STATION
1200mm / 4’ absolute minimum
1500mm / 5’ recommended minimum <60 classroom
1800mm / 6’ recommended minimum >60 classroom

DISTANCE CONDUIT STUB (CENTER) FROM PRESENTATION WALL
add 600mm / 2’ to above #'s

DISTANCE SIDE WALL TO TEACHING STATION
1000 / 3’ minimum
add 400mm / 16” for conduit location
Located to one side of screen so professor does not block view of screen
(unit itself is below screen base and will not obstruct)
Located on side away from entrance/exit
Optional rotated to face classroom by +/- 15 degrees.
* Fixed to floor - not movable

Conduit Feed

- Conduit feed is through the floor, feeding into the empty base of the unit.
- Ideal feed is ballast box located 6” within outside edge of unit (shown)
- Ideal feed is flush with floor, maximum protrusion is 1.5” above flush
- Flush mount standard terminations are preferred to floor monuments with custom/proprietary connections
- Feed includes data & power in ballast box with standard plug-in connectors (i.e. conduit feed is a finished connection point with A/C and network plugs for UofT to plug into when installing Teaching Station at project completion)

Typical Conduit Requirements
- 2x Quadplex power - to power computer etc. and to connect to 2 external side duplex
- to video projector - video feed, control cable, CAT6 computer cable
- to lighting controls - digital Crestron control
- to Network box - network CAT6 x 8 (refer to UTM Communications Cabling standard)
- to speakers - from amp located inside Teaching Station
- to left corner of screen - for screen raise/lower control

*Contractor’s proposed equipment list will be subject to UTM Approval"
## Appendix C
### ALC Teaching Station

**University of Toronto Mississauga ALC Electronic Podium**

**Use**
Electronic Podium for Active Learning Classrooms
- Controls all room audio visual equipment including data projector(s), monitors, room microphone / audio systems, camera PTZ control, switcher input/output controls
- Controls lighting and projection screen raise/lower if applicable
- Internet connection and UofT UTORid log-in

**Equipment**
- Crestron processor and automation must integrate with Fusion RoomView monitoring processes
- Technical furniture podium enclosure – installed/fixed to floor
- Touch-Screen for all room AV controls
- On-board computer & keyboard, dual monitors (to be supplied by UofT)
- Wired internet connections
- Reading light
- VoIP handset for AV contact
- Wireless microphones
- Fixed arm microphones
- 4x USB in connection to computer
- VGA/HDMI cable for connection to laptop computer
- Audio cable - headphone mini-jack
- Wireless audio/video connectivity for mobile devices from ANY/EVERY platform
- Power outlets (2)
- Fans (2)
- Audio volume control (room amplifier inside unit or external)
- Audio/Video source selector (Crestron)
- Monitor/Touch screen for computer on articulating arm
- Document camera

*Contractor’s proposed equipment list will be subject to UTM Approval

**Position**
Central location in classroom; no front of class location

**DISTANCE CONDUIT STUB (CENTER)**
To centre of room

**Conduit Feed**
- Conduit feed is through the floor, feeding into the empty base of the unit.
- Feed includes data & power in ballast box with standard plug-in connectors (i.e. conduit feed is a finished connection point with A/C and network plugs for UofT to plug into when installing Teaching Station at project completion)

**Typical Conduit Requirements**
- **actual requirements TBD by project, no conduits to be more than 20% fill**
  - 2x Quadplex power - to power computer etc. and to connect to 2 external side duplex
  - to video projector - video feed, control cable, CAT6 computer cable
  - to lighting controls - digital Crestron control
  - to Network box - network CAT6 x 8 (refer to UTM Communications Cabling standard)
  - to speakers - from amp located inside Teaching Station
  - to left corner of screen - for screen raise/lower control

**Size (approximate)**
- Approx. 12 ft² footprint
- Unit height - adjustable