Lancaster University

ISS Learning Lab Specification

v1.9

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Contents

Always check the latest documents versions.

A Learning Lab, otherwise known as a PC Lab, would typically have the following properties:

- Flat-floored teaching space.
- Guideline size: Up to 80m^2.
- Guideline capacity: Up to 100 people.

Podium

1. The lectern solution for a Learning Lab must have a single 19" rack enclosure with a minimum of 14U rack space. Examples can be found at http://teammateworld.com/educator-single-varihite-lectern/ and https://www.top-tec.co.uk/Lecterns/EXPERT_Range/

2. The Control Panel Housing to be hinged from the top to allow access for servicing.

3. The lectern should be installed in front of the teaching wall facing towards the student seating area. The lockable castors must be supplied and the unit should be moveable but left with the castors locked down.

4. When providing power to the podium a single power feed to the unit must be used, with the exception of the power feed to the PC which should be separate. It should not be possible for the user of the equipment to power cycle the unit themselves. A smart PDU with control to reboot all equipment in the rack must be installed. The PDU must also have a physical front panel button or menu option to reboot the unit locally. The PDU must be behind the locked door of the cabinet to prevent unauthorised access.

5. Up to eight number network connections will be required into the Lectern. A small offline network switch can be used for local LAN data such as Dante, these must be separated from any LU network connections. Sufficient quantity of CAT6 data lines should be provided as patch cables from a connection box in the wall through a channel in the floor to the desk to allow these to be routed to the equipment. The number of sockets required must be determined at System Design stage.

PC/confidence monitor

6. The installation should provide a suitable 24" display which will act as the PC's monitor as well as providing a confidence monitor for all the AV inputs provided. If the display screen or projector is interactive then there is no need for this display to have interactive features.

7. The display should be mounted on a double articulated arm on the lectern. The arm should be adjusted to the appropriate tension to hold the weight of the monitor.

Projector

8. A suitable display of sufficient size appropriate to the dimensions of the room should be considered. This screen should include the facility for interaction. It is recognised that the size of some rooms will dictate when another display technology is more appropriate.

   Appendix A can be used to determine whether a display screen or projector should be used.

9. Any display screen used must be capable of displaying a 4K resolution image.

10. Any projector must fulfil the following minimum requirements:

    - Minimum of 6000 ANSI lumens.
    - 1920x1200 resolution

- 16:10 format.
- Serial control interface.
- Support for the PJLink protocol.
- Laser light source

11. An ultra short-throw projector accompanied with an interactive whiteboard may be specified when a display screen is not sufficient.

12. If necessary the projector should be ceiling-mounted on a Unicol type pole.

13. In some cases, a ceiling mount may not be practical and in this case a rear mounting with a long throw lens should be used.

14. Consideration must be given to health and safety regulations covering working at height, in relation to projector maintenance. For example, projector lifts to be specified where applicable.

15. Video and control signaling to the projector or displays must run over Cat6 Shielded cable correctly terminated at each end. A second backup CAT6 cable must be installed for each device and correctly terminated for future use.

Projection screen

16. In the case of a short throw projector then a fixed screen is appropriate. A white border is the preferred choice for any fixed screens.

17. If a short throw projector is not fitted, a new, electrically powered 16:10 projection screen must be provided. The screen should be powered from a fused spur located immediately above the screen and above any false ceiling. The screen should be controlled from the control system, lowering when the system is powered on and raising when powered off. The control system should allow for the user to raise the screen if needed without a full power down of the projector.

Repeater displays

18. It may be necessary to have repeater displays to allow more detailed information to be viewed. The repeaters should mirror the content shown on the main display screen.

19. Repeater displays should be native 4K resolution, with 16/7 operation. The displays must be powered on and off with the main display and relevant input selected.

PC

20. Lancaster University ISS will supply a PC to be installed in the lectern.

21. The installer must provide a 3U rack mounted shelf which must prevent the PC from moving back in its rack and also from being removed from the front of the rack.

22. The following parts of the PC must be accessible to the end user: Optical drive, USB ports, power button.

23. The PC will be supplied and installed by ISS. The installation must provide:

    a. C113 10A power input.
    b. HDMI or Displayport output to video scaler/switcher.
    c. The installer must specify which connection so a PC can be configured.
    d. USB output to interactive display or interactive whiteboard.
    e. USB output to USB sockets on lectern connection panel and or confidence monitor.

f. Cat6 ethernet connection.
g. Audio out to audio switcher which may be on the HDMI connection.

Camera

24. A PTZ camera for use with lecture capture and video calling must be specified. The camera must be ceiling mountable with USB cabling extended with appropriate extenders or converted to CAT6 cabling for longer distances. The camera should have the following characteristics:

    - Controlled via RS-232C (VISCA) or LAN if separate local network switch is provided.
    - At least 10x Optical Zoom.
    - At least 50 degrees wide angle lens.
    - Simultaneous HDMI Output and USB 3.0 output.
    - Auto tracking feature than can be turned on/ off from touch panel.

25. It is not necessary for the camera to have a direct input to the projection system as a presentation source however the PTZ controls should be present on the touch panel. USB 3.0 output should be presented alongside the additional audio and video connectivity.

26. The camera will be connected via USB to the Teaching PC and a users laptops when required. PTZ controls must be present on the touch panel with preset recall available to a standard room user.

Video switcher/scaler

27. A suitable video switcher must be used to switch inputs instead of using the projector or display to switch sources.

28. All sources should be scaled to the native resolution of the projector or display.

29. It must be possible for the user to blank the feed to the projector and any repeater displays whilst leaving signal displaying on the confidence monitor.

30. A spare HDMI input must be kept available in each room on the switcher to allow for an additional presentation source to be added in future. This input must not be shared with another source and must be able to be switched to via the control system.

Wireless BYOD mirroring device

31. A wireless connection device should be provided to allow mobile devices to be connected to the display. The device should connect to the Lancaster University network and must not rely on using an internal wireless router for connections to devices. The device must be supplied with a perpetual software subscription license for Education.

Audio

32. An audio system to provide program sound should be installed; all signals shall be able to be switched to the program sound speakers.

33. Wall mounted speakers should be installed, which should normally be white unless specified. All input channels must be balanced, and a suitable mix should also be provided to the induction loop.

34. Voice reinforcement is required in the rooms, and should be provided by two suitable digital wireless lapel microphone system using 1.9GHz frequency. The units must be supplied with a

rechargeable battery pack and desktop charging cradle/device. Monitoring must be available to check power status, battery life and mute status.

35. An overall volume control with a programmed default level shall be provided on the control system.

36. Wall speakers or ceiling speakers should be of good quality and be supplied with a full back-box and all necessary baffling. Voice reinforcement loudspeakers must not be placed to close to the lectern (source). Gain structure, appropriate EQ and delays should be used dependent on the space, to ensure a consistent audio experience without introducing feedback.

37. A suitable multi-channel amplifier shall be provided to power the loudspeakers.

38. If secondary pairs of fill speakers are installed the ability to delay audio should be considered.

39. A Microsoft Teams Certified DSP audio system to provide program sound, Tutor Voice reinforcement, audience microphones for conference feeds to the PC as well as to a laptop via USB should be installed. The USB drivers must be class compliant to avoid the need for vendor specific drivers to be installed. The USB feed must switch between either the PC or a laptop with users able to select which device receives the active USB connection. All microphones must be fully EQ'd for the room with appropriate gain structures applied to eliminate feedback.

40. Separate audio mixes must be available for the room reinforcement and feeds to USB Devices for recording and conferencing. These must be available via the Control panel Engineer pages. Discrete level control of inputs and outputs with muting per channel available for all mixes.

Assistive hearing system

41. An inductive loop shall be provided in all Learning Labs, this should provide a voice signal as captured by:

    - the wireless microphone(s) and a white button style microphone located on the top of the lectern desk ***or***
    - a white ceiling-mounted microphone above the lectern.
    - An auto-mix should be applied to ensure only on

42. The loop system **must** provide a suitable mix of program sound as well as voice.

43. The finished and tested hearing loop system shall comply with all current legislation.

Lectern connectivity

44. The lectern should provide a brushed metal connection panel for laptop and auxiliary connections, connections provided should include (but may not be limited to):

    a. Laptop HDMI input connection.
    b. 1 x laptop network RJ45 connections.
    c. 5a power sockets on control power housing fused separately to the rest of the rack for laptops.
    d. USB Socket connected to PC.
    e. USB Socket for laptop devices to access room camera and microphones via DSP

    For Panel Layout see Appendix B.

45. The HDMI leads must be presented through the hinged control panel housing to the switcher input with suitable restraint inside the equipment rack. This is to avoid the need for an input plate so that cables cannot be removed from the room. For servicing the HDMI cable must be coupled within the CPH.

46. The lectern should also provide housing for the control touch panel.

Additional audio and video connectivity

47. Inside the TeamMate we require presented on a rack strip:

    - Left and right program sound and microphone mixed output – 2 x male XLR line level.
    - 1 x HDMI output from projector feed (2 if dual projection).

Control system

48. A touch panel-based control system will be provided to control all of the audio visual equipment in the room.

49. An control panel of approximately 7” must be provided and the panel design must adhere to the Lancaster style of touch panels.

50. The control system should connect to an Room Controller of appropriate capability for the features of the room. The control system should provide a means of controlling all inputs and outputs of the system as well as interfacing to elements of the room such as a powered screen (if fitted).

    Touch Panel layouts and functionality are outlined in Appendix C.

51. It must be possible to connect a second touch panel device to the system without the need for Lancaster University to make alterations to the control code.

52. A PIR sensor/occupancy sensor to control presentation system power state to wake up the system on occupancy and initiate a shutdown after a period of inactivity. Timers must be controllable via Engineer administrator page on the touch panel.

Programming

53. The Control source code and hardware configuration exports must be handed to ISS upon completion for the purposes of backup and restoration when required.

54. Engineer Administration pages to adjust advanced features of the room protected by a PIN code.

55. Automatic shutdown of the system should be included if the system has not been used for 3 hours, not used means no buttons pressed on the control system, no motion detected by the panel motion sensor (if fitted) and no active video source. The option must be available to adjust the timers and disable the function from the Engineer administration pages.

56. Automatic start up of the should must be programmed in via a timer set to wake the system up at a specific time of the day with the option to disable this function. Options to adjust timers and disable the function only available from the Engineer administration pages.

57. The Engineer Administration pages must show the status information of the connected control devices.

58. The Engineer Administration pages must allow the various volume mixes to be adjusted.

59. If equipment varies Lancaster University will confirm full functionality of the control system. Before sign off can be agreed the system will undergo full user testing as shown in Appendix D.

60. All firmware must be the latest approved versions as indicated by Lancaster University at the time of install.

61. All code is subject to agreed change control procedures and must not be modified without the express agreement and scheduling by Lancaster University.

Remote monitoring and control

62. The control system must interface with the our room management systems and must provide a minimum of:

    a. Projector or display screen power status.
    b. Source input usage.
    c. Projector lamp hours (if projector present).
    d. Projector filter times (if projector present).
    e. The status of all connected devices.
    f. Remote control of the touch panel (if present).
    g. Power usage.
    h. Error statuses of all connected devices.
    i. Current volume level.

63. The contractor must liaise with ISS to determine the exact requirements of the integration required.

Occupancy Sensor

64. A suitable occupancy sensor to be provided to allow the control system to monitor and control power state. If no activity is detected within the space or does register a button press from the control panel within a programmed time period, the system will be automatically shut down to reduce power consumption.

Cabling and installation

65. All cables entering or leaving the podium must be protected by a black braided umbilical cord with a moveable distance of approx. 2 metres. There should be strain relief to the umbilical cord of a shorter length than the cord to prevent accidental damage to cables when moving the unit.

66. All cabling should run in suitable containment above the suspended ceiling, in wall voids or under the floor. Permitted containment options include copex, cable baskets or concealed trunking. **Surface Mounted trunking and visible cable snakes will not be permitted**, except cables between the floor box and the lectern which should be braided in a black umbilical with sufficient length to allow the lectern to be repositioned.

    - All cabling must be run in suitable containment, e.g. circular polypropylene flexible conduit.
    - It is not acceptable to share a cable conduit with power or data cabling.
    - Where three-compartment shared trunking is used power cabling, data cabling and AV cabling must run in separate compartments.
    - Where individual conduits are installed for AV cabling 40mm conduit is preferred. Two 25mm conduits for AV cabling are also acceptable. This is the minimum requirement;

additional conduits may be requested depending on the number of cables required for the installation.

- Cables running in ceiling voids must be installed within suitable containment used for AV cabling only sufficient to meet all current Fire, Electrical and Health and Safety regulations. All cabling run in containment must be rated as CPR Cca Class or higher for Fire performance.

- For Example:
  - Cables should be contained in 32mm Copex, e.g. https://uk.rs-online.com/web/p/conduit/0623710/
  - Fixed to the soffit/slab with metal tie wraps, plastic ties must not be used, e.g. https://uk.rs-online.com/web/p/cable-ties/1235035/
  - The metal tie wraps must be looped through flat hanger screws fixed with a nylon wall plug to the soffit/slab at no more than 1m intervals, e.g. https://www.gexpro.com/usg/Root-Category/Fasteners/Fixture-Hardware/Hangers%2C-Bolts/Screws---Flat-Hanger/Multiple-631-Flat-Hanger-Screw/p/523430

The containment must not be fixed to any existing data cabling baskets or trays as this contravenes the ISS Networking Installation specifications.

67. All Cables must be labelled at both ends with the following information: Signal type, source, destination, e.g. Sig - HDMI, Src – PC, Dest – Switch Input 1.

68. In all cases the floor box should be able to be fully closed; this may necessitate right angle connectors for shallow floor boxes.

69. Final build schematics showing all devices and connectivity must be provided for video signals, audio signals and control signals as well as the rack build layout.

70. Manufacturer, model, serial numbers and MAC Addresses of all equipment in each room should be provided to Lancaster University as part of the handover process.

71. All equipment installed at height must have low level electrical isolation, e.g. for each projector, display screen or other powered device.

Whiteboard

72. New vitreous enamel magnetic whiteboards should be provided in Learning Labs, these should be fixed mounted and cover as much of the teaching wall as possible. In the case of an electric screen then where possible it should avoid covering whiteboards when in use. If a display screen is used then they should be installed either side of the display screen if space allows, otherwise they should be installed on other wall space. Additional whiteboards may be required on walls other than the main teaching wall, dependent on space.

Wireless networking

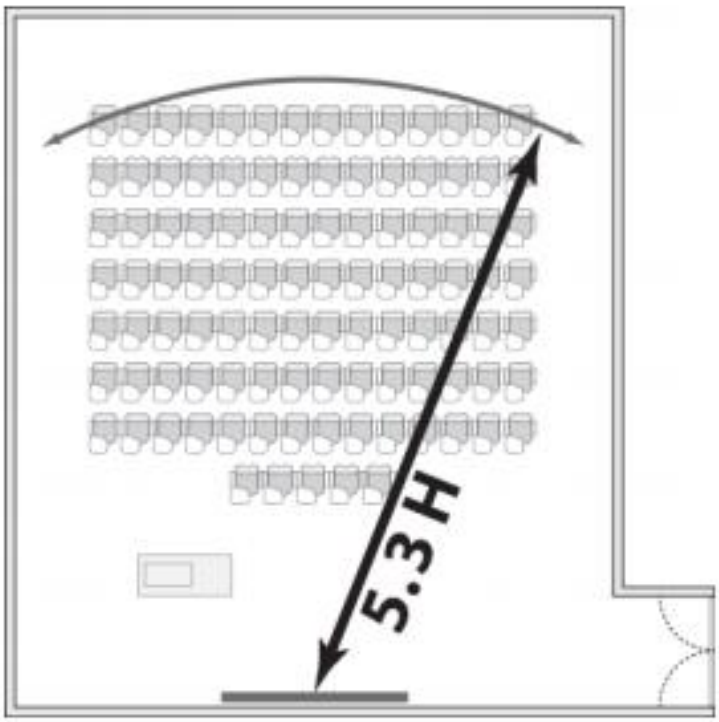
73. A review of the wireless coverage of each Seminar room should be undertaken by ISS Networking and if necessary, additional high-level CAT6 data points should be provided to support wireless access points.

Physical space

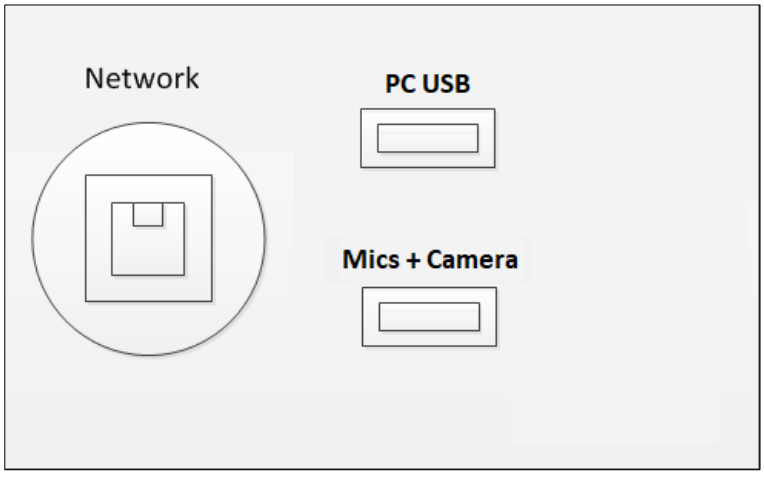
74. The room should contain one PoE powered Digital LED Clock with 4” digits.

Appendix A – Screen size calculator

The height of the display screen should be no less than the distance from the centre of the screen to the furthest audience member divided by 5.3, i.e. **D / 5.3 > H** (where screen height = H; distance to further audience member = D).
AETM Audio Visual Design Guidelines 2nd Edition Rules for Screen Size and Sightlines.



Appendix B - Panel layout for Lectern



Appendix C - Touch panel layout and functionality

ISS will provide a TP design which can be used to create the desired look and feel of the control system.

Appendix D - Sign-off documentation

All work is subject to final sign-off and approval. All elements of the installation including the control system and interfaces to external systems must be shown as working.

The sign-off documentation will be provided at the start of the project and can also be found here for reference.