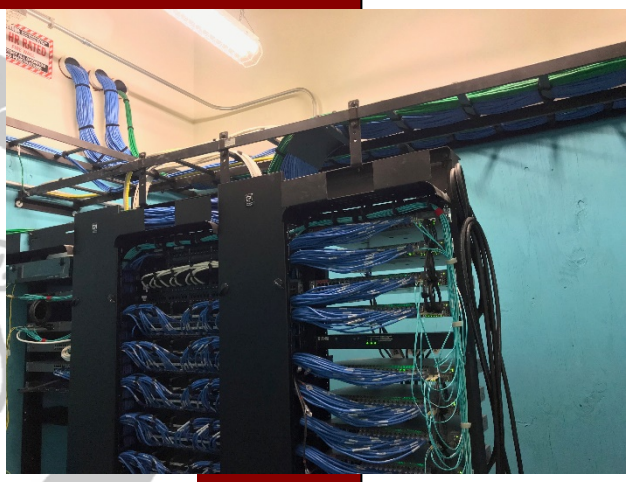
UMass Amherst

Information Technology

Design and Construction Guidelines

December 2018



2.13 INFORMATION TECHNOLOGY AND COMMUNICATIONS

2.13.1. General

A. UMass IT/ Cable Engineering Services (CES) is here to help any designers with answers to any questions that arise from guidelines in this document, how to tie new renovation and construction projects in with our existing infrastructure, and clarification of our current specifications.

   1. Contact CES Project Engineers: Marcin Celmer or Gary Cromack at 413-545-3535

B. Early in the design phase the designers, building occupants, UMass Project Manager, and UMass IT (IT Project Manager & Project Engineer) need to review the project's IT requirements.
C. Note that some equipment must be proprietary to integrate with the existing campus infrastructure and systems; such equipment is indicated in the Design and Construction Specification.

2.13.2. CAMPUS FEEDER CONNECTIONS

A. Each new building should be connected, via 4" fiberglass conduits encased within rebar reinforced concrete duct bank, to the nearest existing telecom manhole.
B. Minimum duct bank entry into the building is generally 4 - 4" conduits. 1 - 4" conduit for telephone, 1 - 4" conduit for fiber and 2 - 4" spare conduits.
C. Copper phone feeders should be tied into an existing splice case in a manhole or go to the nearest telephone switch room. They also need to be terminated on lightning protection blocks on both ends.
D. New buildings should have two independent fiber feeds to separate major nodes on campus.

2.13.3. CABLING SYSTEM - FIBER & COPPER

A. The campus cables its buildings with single-mode fiber and structured Cat 6/6A copper cabling utilizing Corning and Commscope respectively for materials and hardware.
B. The horizontal cabling system should be a blue-jacketed Category 6 wiring system. It also should always be riser rated cabling unless plenum ceilings require otherwise.
C. The horizontal cabling system for wireless access points (WAPs) should be a green-jacketed Category 6A wiring system for wireless access points, which are fed by two cables.

   1. On the WAP device end the Cat 6A cable should be terminated with a male RJ-45 end for direct connection into the WAP.
   2. In special research applications that require 10 Gb Ethernet service Category 6A with a green jacket should also be used.

D. All category cables are treated, terminated, and labeled the same in the same patch panels. There is no distinction between a phone or Ethernet jack as their use is interchangeable.
E. There is a custom labeling standard used on campus and it must be followed everywhere.

2.13.4. BUILDING ENTRANCE TERMINAL (BET) OR MDF

A. The BET/MDF is where all fiber and copper building feeders are to be terminated for distribution to the other IDFs within the building, be located in the basement or lowest level, and in the immediate proximity to where the cable feeder conduits enter the building.
B. Minimum room size should be 8 ft. by 15 ft. however building size and function may require larger spaces as it should provide adequate space for equipment and service personnel.

C. Fiber feeders should be terminated in the first active equipment rack.

1. Each IDF in the building should have a 12 strand SMf from this location to its own patch panel located in the first active equipment rack.

D. Copper feeders should be terminated on lightening protection blocks on the wall.

1. Each IDF in the building should have a voice riser, count TBD, from this location to its own patch panel located in the first passive equipment rack.
2. The BET/MDF should also get a voice riser, count TBD, from this same location to its own patch panel located in the first passive equipment rack in the same room.

2.13.5. NETWORK CLOSETS

A. Closets should be stacked, centrally located on each floor, directly accessible from the building corridor, and at minimum size 8 ft. deep and 12.5 ft. wide with door swinging outwards.

1. Provide 6 - 4" sleeves to the spaces above and below. Make the sleeve/ bushing rise above the floor approximately 3" to minimize the possibility of water migrating down through the building. The sleeved openings should be located against a wall with backboard attached. Ladder rack sections should be installed to facilitate the associated vertical cable transitions of riser and station cables.

B. Due to the significant operational costs for each network room, it is preferred that they only be provisioned at a certain minimum threshold; approximately 250 jacks/cables minimum. Obviously, the 100-meter Ethernet distance limit trumps this effort to rationalize network room counts.

C. They should allow for four 19” equipment racks. Two for fiber riser and networking equipment, one for voice riser and horizontal cabling, and one for DAS equipment.

1. Active and passive racks should alternate starting with an active rack with the fiber patch panel then a passive rack with the voice riser patch panel.

D. Any structural steel that requires fireproofing must be enclosed in sheetrock. No spray-on fireproofing compound should be exposed or visible in closets due to long-term dust issues from this material being disturbed and fraying over time.

E. Provide smoke detector type fire protection. If sprinklers are absolutely required by code, add wire cage protective covers over sprinkler heads. Substitute smoke/heat detectors, if possible, in the hope that it eliminates possible water discharge events.

F. Evaluate the heat load and cooling needs of each IT room based on equipment schedules provided by UMass IT.

1. Typically our network rooms generate between 4KW and 10KW of heating load (about 12,000 to 30,000 BTU’s per hour), depending on the size of the room and equipment installed.
2. Heat exchange units should be located in such a way that they are not directly above any equipment racks.

G. Every IT closet should have a standard UMass card access type controller to regulate entry.

H. Miscellaneous details:

1. Low-static vinyl tile floors
2. No drop ceilings in closets

2.13.6. CABLE SUPPORT AND PATHWAY REQUIREMENTS

A. Design all cable pathways to provide at least 40% additional cable capacity for future expansion.
B. In main corridors with suspended ceilings provide cable tray, with 8” clearance above, for support of large cable bundles.
    1. Alternatively, run a Snaketray type support system along both sides of the corridor with crossovers spaced as required.
C. In areas with only a few cables are to be installed above a suspended ceiling, such as an office or work room, provide metal J-hangers fastened to the underside of the slab, walls above ceiling, or to building steel above.
    1. Distance between hangers should comply with Cat 6 requirements spaced ~4’ apart.
D. Where solid ceilings are installed, 2 ft. x 2 ft. access panels must be provided every 10 feet along ceiling pathways or EMT conduit runs across the entire ceiling.
E. Where cable path is in an exposed area, and if cable tray inappropriate, use adequately sized EMT (based on 60% fill) with pull boxes every 100 feet maximum and/or every 180 degrees in bend. Bends should be sweeps, not pull boxes nor LB types.
F. Install cable tray from the Building Entrance Terminal room to the nearest of each of these stacked UMASS AMHERST IT rooms. Alternatively, install an adequate quantity of 4” conduits. If conduit runs are used to feed these rooms, they should have readily accessible pull box(es) after every two 90 bends and/or every hundred feet. Whether cable tray or conduit, provision 40% unused spare capacity.
G. Provide cable pathway details and access details during the design review process.

2.13.7. CABLING OUTLET REQUIREMENTS

A. The Tel/Data Designer needs to provide tel/data outlets at all of the following locations: phone, FAX, Ethernet, card access controllers, CCTV, security, wireless access points (WAP’s), networked equipment such as printers, ceiling/data projectors, display screens, A/V equipment racks and associated accoutrements, copy machines, vending machines, cash registers, elevators and their control machinery, power and energy management monitors, clocks, fire alarm panels, etc.
    1. Each of the above listed systems have their own particular UMass requirements. In consultation with users and occupants, the designer will need to identify the locations of such equipment and include any such special requirements to integrate them into existing UMass systems.
B. All Tel/Data outlets provided for such special equipment should terminate in a suitable outlet box, external to the special equipment so that the network circuit can be disconnected and tested without having to open up the associated equipment.
C. Tel/data outlets in walls should comprise a 4-11/16" square deep metal box, flush in the wall where possible, with a mud ring adapter for a single gang cover plate.
D. Outlets should have at a minimum a 1" EMT within studded walls (or other approved surface raceway if necessary) homerun to the nearest IT room. Homeruns are to have bushings at each end and pull boxes, and pull string in place.
    1. Alternately, if there is a readily accessible drop ceiling, stub an EMT up in the wall and extend it up to the accessible ceiling space.

E. Outlet height should be in the range 18" to 48" AFF (with exceptions as needed). Coordinate with the furniture specifics and equipment locations. Outlets should not be installed in a location that will later be covered over by a modular furniture panel or become otherwise inaccessible.

    1. Provide Data Outlets for all vending machines. Locate on the walls behind vending machines with 78” clear AFF.

2.13.8. ACTIVE NETWORK SYSTEM DESIGN

A. At the point where the designer can provide a provisional layout of the building, room functions, approximate numbers of occupants, density of IT services and an UMASS AMHERST IT Room schedule, contact the UMass IT Project Manager for a schedule of the network equipment and its heat load characteristics.
B. At the point where the Designer is able, provide the settled floorplan design to the UMass IT Project Manager who will then provide the wireless design back to the Designer, and define exactly what and where the wireless AP devices should be installed (by the contractor). We insists on providing our own AP device layouts.
C. For Audio Visual requirements contact the UMass IT Project Manager to provide the UMass standard requirements.

2.13.9. NEUTRAL HOST DISTRIBUTED ANTENNA SYSYTEM (DAS)

A. Designers should work with the UMass IT DAS Project Manager for our standardized campus implementation of DAS to provide adequate cell phone coverage. This may include assessment of service and vetting of options with the carrier, Verizon Wireless, the campus has an agreement with.

    1. In most cases the project will provide the pathways and utilities needed to facilitate the installation of the system.
    2. Any existing DAS equipment on a building affected by a construction project needing relocation or adjustment must also go through the DAS PM and is the cost of the project to do so.