

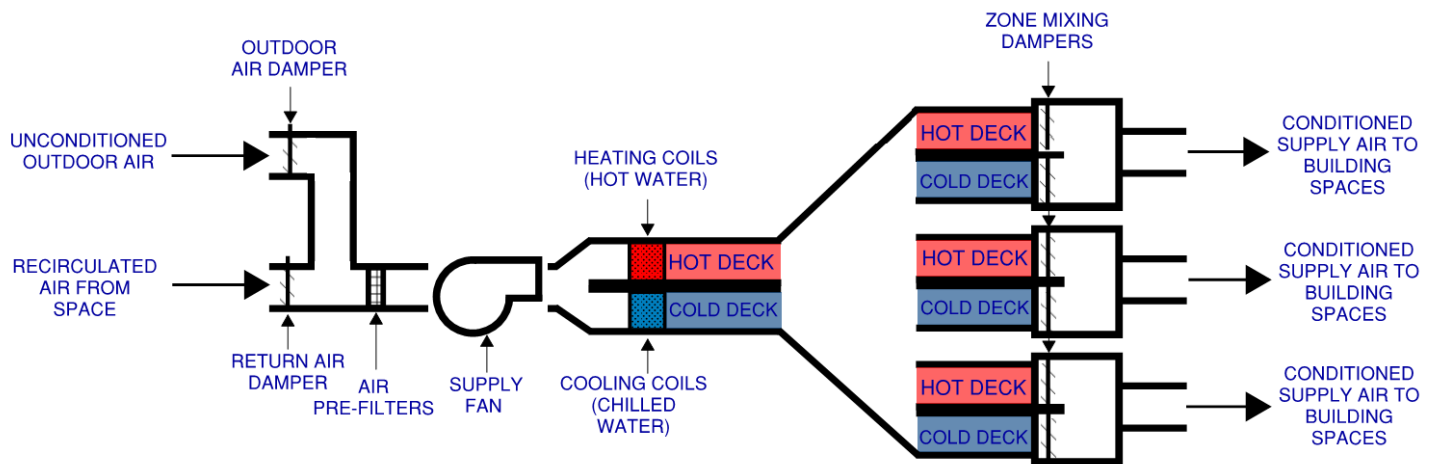
## PHYSICS BUILDING

The Physics Building was originally built with multi-zone air handling units. Outside air is ducted to each Multi-zone unit where it mixes with ducted return air from each floor as the constant-speed fan in the air handling unit draws it through a wall of filters.

The auditorium HVAC was renovated in 2012 with a roof-mounted variable air volume system that includes UV filtration, demand-controlled ventilation, and outside air economizer capability.

### MULTI-ZONE AIR HANDLING UNITS

Each Multi-zone Air Handling Unit (AHU) provides ventilation, air filtration and movement, and heating and cooling functions to a single floor. Each AHU has a hot water heating coil and chilled water cooling coil that respectively generate parallel warm and cool air streams. The air flow is distributed to a number of ducts that exit the AHU to serve individual zones, which may be single rooms or groups of rooms depending on their size. Each zone's duct has a mixing damper that allows only warm air, only cool air, or a mixture of the two, depending on the signal being sent from the zone thermostat. Ventilation is provided at each AHU by drawing a mixture of fresh air from outdoors and recirculated air from the floor being served by each AHU.



**MULTI-ZONE AIR HANDLING SYSTEM SCHEMATIC**

## VARIABLE VOLUME AIR HANDLING UNITS (Physics Auditorium)

Variable Volume Air Handling Units (AHUs) deliver a variable volume of conditioned air consisting of a mixture of recirculated building air and fresh air from outside of the building. The building return air is mixed with outdoor air, filtered and cooled with chilled water coils in each of the two building air handling units before being supplied to rooms throughout the building via above ceiling ductwork.

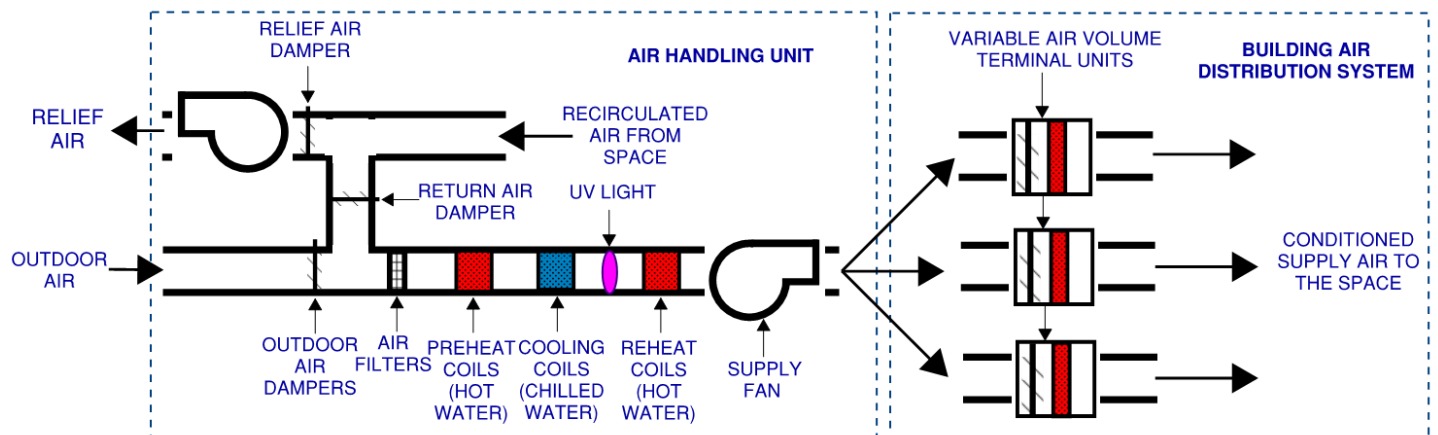
Space heating is provided by Variable Air Volume terminal units (VAVs) with hot water reheat coils located in supply ductwork throughout the building. The VAVs are equipped with an air damper to regulate the volume of air delivered from the central AHU to the space based on the current space temperatures and a hot water reheat coil to provide space heating when called for by a space thermostat.

Air is recirculated from the spaces back to the air handling unit through ceiling mounted air return registers located in each space. Return air is pulled from a plenum space above the ceiling, in lieu of ductwork. Exhaust is provided in restrooms on each floor to remove odors and to maintain a slightly positive building pressurization.

The auditorium AHU is also equipped with demand controlled ventilation strategies which serve reduce ventilation levels when the space is unoccupied; however, this has been disabled as part of FMD's COVID-19 Response Plan. The AHU is also capable of air side economizer operation which serves to increase the ventilation rate when outdoor air conditions are appropriate. The AHU is also equipped with UV lights which serve to inhibit biological activity in the unit.

Chilled water is supplied throughout the building from a chiller located in the basement mechanical room along with being imported from the South/Science Campus Chilled Water District.

Hot water is provided by a steam to water heat exchanger which uses steam delivered from the Central Campus Steam Plant to heat water used for air heating in the building.



**VARIABLE VOLUME AIR HANDLING UNIT SCHEMATIC**