THE PURPOSE OF THE LABORATORY DESIGN GUIDELINE: This guideline is a general overview of the design attributes that will impact the planning, design, construction and maintenance of Northwestern University's (NU) research facilities. As a living document, this guideline will evolve in the face of changing needs of NU, research, technology, methods, and people.

It is the responsibility of professional laboratory planners and design professionals to use the guideline to complement their well-developed design knowledge and experience by providing contemporary research facilities that will assist NU to effectively and successfully compete with its peer organizations for [1] the best students, faculty and staff, and [2] for available public and private research funding.

Because of the varying ages and physical conditions of the NU research facilities, there can be a wide range of laboratory configurations, installed MEP system, finish and fixed

LABORATORY CODES AND REGULATIONS (Most Recent Editions)

The design architects and engineers shall refer to codes, regulations, or other requirements as stipulated by, but not limited to the American National Standards Institute (ANSI), National Institutes of Health (NIH), Occupational Safety and Health Administration (OSHA), National Fire Protection Association (NFPA), Centers for Disease Control (CDC), and others for the general and specific details of a particular research facility or space. The above list is not exhaustive, so it is the responsibility of the architectural and engineering designers to utilize all necessary and appropriate documents that will contribute to the planning, design, construction, and operations and maintenance of a research facility at NU. Contact the Northwestern University Office of Research Safety for further information on this matter.

GENERAL RESEARCH SPACE CHARACTERISTICS

The NU research (not teaching) labs are designed to support interdisciplinary research. These labs are planned and designed to accommodate a number of procedures and protocols that range from gross physical studies to procedures that provide exquisite characterization of physical phenomena. These laboratories operate 365 days/year, 7 days/week, and 24 hours/day.

1.0 PLANNING

1. Confirm with the Facilities Planning Group the grossing factors to be used on public spaces circulation, offices, labs, lab support, and mechanical and utility chase spaces.
2. Basic planning module is 5'-10" to 11'-0" wide; module depth will vary starting at about 24'-0" (excluding office space).
3. Minimum circulation between lab benches to be 5'-0" from edge of countertop to 6'-0" (or greater) as required.
4. Two means of egress from a lab space where possible, or as required by code.
5. Group main utility runs, and locate utilities for easy access for maintenance and operations, and to minimize disruption to research activities in lab spaces: zoned runs, interstitial floors, equipment corridors, others?
6. Office workstations: May be inside or outside of research spaces, which will impact where students can store personal possessions and drink/eat.

2.0 HEALTH & SAFETY

1. Fume Hood: Default to low-flow, double sash, 6-foot chemical fume hood with flammable and corrosive storage in the base cabinets. A vacuum cabinet may be required for fume hoods in chemistry type labs. Please discuss and confirm with the researcher(s) and Office of Research Safety, lab utility service (e.g. power, water, specialty gases) installed in the fume hood.
2. Biosafety Cabinet: Default to Class II Type A2 unless otherwise indicated. Please discuss and confirm with the researcher(s) and Office of Research Safety, lab utility service (e.g. power, water, specialty gases) installed in fume hood.
3. Avoid doors between lab spaces and emergency shower and eyewashes.
4. Consolidate emergency shower and other lab safety service (blanket, spill kit, etc.) together at an easily accessible area in lab.
5. Locate fume hoods and biosafety cabinets away from main lab circulation paths and entrances to lab spaces, and away from the supply air register in the ceiling system.
6. Create clear and direct interior lab circulation paths to lab entrances with no dead ends.
7. Minimize obstructions to visual sight lines through lab spaces where possible.
8. Minimize tripping hazards by provide space off of the circulation path for trash, and chemical and biohazard containers.

3.0 ARCHITECTURE

1. Entrance Door: On new construction, and where possible in renovation construction, use 3'-0" x 7'-0" x 1 3/4" solid core wood doors with 0.7-1.8 (i) 3.3 (z) 2.

5.0 FURNISHINGS

1. Student Desks: Where possible, 64” wide x 30” deep with privacy panels, book shelf above the counter and an 18” wide, lockable undercounter, mobile pedestal with a file drawer and two small drawers.
2. Lab Casework: Non-fixed metal casework with resin/epoxy, heat/chemical resistant counter; Use fixed casework only where necessary.
   a. Lab Bench: height adjustable with integral reagent shelves, and space undercounter for mobile or hung storage cabinets or drawer sets.
   b. Northwestern University works with “preferred” vendors who supply a full range of laboratory casework, fume hoods, and plumbing and gas fixture products for use on our campuses. Contact the project manager for contact info and with any questions about the materials, construction, strength, assembly, adjustments, availability and lead times for delivery and installation of the casework.
3. Lab Shelving: Reagents
   a. Edge barrier to prevent object falling off of shelves.
4. Chairs: desk or bench type on casters, non-fibrous upholstery; easy to clean; ergonomic controls; bench chairs with foot rest.
5. Stools: With or without casters; no fibrous upholstery; easy to clean; height adjustable.

6.0 ENGINEERING: HVAC

1. Variable air velocity HVAC system operations tied into Campus DDC system.
2. Duct Material: use 316 stainless steel ducts from fume hoods to point of connection to laboratory exhaust system.
3. Ventilation:
   a. Wet Lab: 100% single pass air.
   b. Dry Lab and Offices: recirculated where possible
4. HVAC Sizing for Lab Equipment Heat Loads (approximate)
   a. Laboratory: 6 watts/SF
   b. Lab Support: 16 watts/SF
   c. Equipment Room: 20 watts/SF
5. Lab Air Changes per Hour (ACH) = 6.2 (Aircuity 2 to 12 depending on occupancy and interior conditions).
6. Lab Space Pressurization = +/- 150 CFM differential pressure, negative to adjacent spaces.
7. Temperature & Humidity (Fahrenheit) & % RH
   a. Temperature: Summer 76 F, Winter 68 F
   b. Humidity: Summer 50% Max, Winter 25% Min.
8. Fume Hood Air Flow (low flow hood) = 375 CFM
9. Fume Hood Face Velocity = 82 Feet per Minute.
10. Snorkel Air Flow = 50 CFM for Nederman FX50 to 75-100 CFM for FX75 (or equivalent).
11. Gas Cylinder Cabinet (Ventilated): 300 CFM for 2 cylinder cabinet, and 500 CFM for 3 cylinder cabinet.
12. Environmental Chambers: Ventilation at 0.5 CFM/SF and