

## **Planning Guidelines for Lehigh University Research Laboratories**

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### **Introduction:**

The purpose of these guidelines is to help the Lehigh community recruit and retain productive researchers in the science and engineering fields in particular. This document should help academic departments provide the most relevant information to the Offices of Campus Planning & Projects and Environmental Health & Safety to make this possible.

The planning time and cost for each laboratory renovation project depend on many variables that include, but are not restricted to the following: hazards associated with the type of work to be conducted, the scale of the operation and the complexity of the equipment used in the research, and removal of existing hazardous materials. This in turn determines which codes, regulations and agencies are pertinent. The most commonly applied codes and regulations are: The International Building Code (IBC) suite (required of all construction by the City of Bethlehem and needed for permits and occupancy), National Fire Safety Code and International Fire Code for guidelines that determine fire protective devices such as sprinklers, ventilation, explosion proof refrigerators, flammable cabinets, etc. Lehigh's insurance companies also help determine what protection is recommended. In addition, private institutions, such as Lehigh University, must also meet government guidelines from federal agencies such as the Occupational Safety and Health Administration (OSHA), the Environmental Protection Agency (EPA), and the Nuclear Regulatory Commission (NRC), and from state agencies such as the Department of Environmental Protection (DEP).

Along with the regulatory environment, the condition and/or presence or lack of required infrastructure in existing buildings can be a major cost driver. Retrofitting older buildings can sometimes cost more and be more complicated than building new. It also may require the proper removal of hazardous materials such as asbestos and lead paint, which also carries a cost in both money and time. Additionally, there is often the possibility of needing to retain outside consultants to design some of the more complex project systems (exhaust, electrical, air conditioning, alarms, etc.). If outside consultants are required, this project cost will be made known well in advance.

Attached is a checklist to consider when planning for a new research lab or a lab renovation. It will provide colleges and departments with an opportunity to properly evaluate the cost associated with research spaces for new hires prior to making final determinations. We hope you find it of value, and we thank you for your cooperation as we work to accommodate your research needs.

**Research Laboratory Design Considerations:**

**Please provide information about all of the following components that may need to be included in the laboratory design:**

**General Information:**

- What type of work or research will you be doing in the lab (*describe below*):
  
  
  
  
  
  
  
  
  
  
- What types of equipment will be used within your lab (*describe all below, include as much information as possible, such as model number, manufacturer, cutsheet, installation guide, etc*):
  
  
  
  
  
  
  
  
  
  
- Is any of this equipment planned be moved from an existing location on campus? If so, where: Building \_\_\_\_\_, Room \_\_\_\_\_ (*list equipment below that is to be moved*)

**Ventilation:**

- Hazardous gas and ventilated chemical cabinets and manifolds (flammables, toxic, acids & bases)
- Hazardous gas leak monitoring and alarm systems (note: if gas monitoring system is installed, the cost of installation and maintenance must be covered by the program.)
- Laboratory hoods and exhaust systems
  - Indicate quantity of hoods needed: \_\_\_\_\_
- Bio-safety systems and components

- Intrinsically safe (non-sparking) air handling systems and number of required air changes
- Emergency generators needed for ventilation systems.

**Chemical Classification and Quantity Inventory:**

- What types of gases will you be using:
  - Hydrogen
  - Oxygen
  - Nitrogen
  - Other (list all): \_\_\_\_\_
- Inventory per category/location (required for occupancy permit and institutional reporting to regulatory agencies)

**Fire Protection System:**

- Sprinkler system – determined by the type of research

**Emergency Preparedness:**

- Does any equipment require connection to the emergency generator (**Note: not all buildings on campus have emergency generators and some do not have capacity available for lab equipment to be added**). If requested or required, please indicate why:
- Does your current lab have an emergency plan? If so, please attach a copy to this document.
- Power outages, water/flood damages, data protection, emergency access, etc.

**Waste Disposal Requirements (this is the responsibility of the home department):**

- Bottled gases, chemicals, contaminated materials, radioactive and biological waste

**Standard Equipment:**

- Eyewash stations and emergency showers
- Fire extinguishers, fire alarms and exit signs

**Specialized Equipment** (may require additional infrastructure such as cooling, emergency power, etc.):

- Ovens, furnaces, freezers, explosion-proof refrigerators and high-voltage equipment
- Clean rooms, Cold rooms, Warm rooms, Microscopy facilities
- Safety and Security systems including gas detection and alarm systems
- Lasers (special alarm/notification that a laser is in operation)
- Equipment that generates radioactivity
- Equipment that is used in nanotechnology
- Biosafety cabinets and lab equipment
- Emergency power for running research equipment (as opposed to life safety equipment such as ventilation, emergency lighting and fire alarms)

**Environmental Conditions:**

- Temperature parameters (is constant temperature required or a specific temperature range?)
- Humidity requirements
- Laboratory cleanliness (clean room conditions? General laboratory cleaning?)
- Lighting requirements for lab (general lighting and specialty lighting for experiments)
- Supplemental heating and cooling units, especially if there is a significant amount of equipment in the room and/or required temperature maintenance.

**Office Space Design Considerations**

- I have a current office on campus
- My current office is in Building \_\_\_\_\_, Office \_\_\_\_\_
- When I move my lab to HST, I need an office within HST (provide justification below):

- When I move my lab to HST, my current office will be vacated and can be reassigned.
- When I move my lab to HST, my current lab in Building \_\_\_\_\_, Room/s \_\_\_\_\_, can be vacated and reassigned.
- Lab space is needed for my research team consisting of \_\_\_\_\_ number of people.
- Office space is needed for my research team. \_\_\_\_\_ number of workstations are required.
- \_\_\_\_\_ number of private offices needed
- \_\_\_\_\_ number of grad workstations needed (**Note: these may be in an open work area**)
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