DIESEL AND PRECISION AGRICULTURE LAB

SPACE DESCRIPTION

The Diesel and Precision Agriculture Lab is a large, open bay space for instructing students in the fundamentals of maintenance in diesel trucks or farming equipment. This may be shared or used solely by the Diesel and Precision Agriculture programs due to similar functional, space and utility requirements. In this space, students learn how to operate, diagnose, and repair high-tech vehicles using the latest equipment and technologies. The Mechanic Shop is the main training area, with high ceilings and expansive bays for servicing large vehicles. A Dyno Lab, Classroom, and Secure Storage room adjoin the Mechanic Shop for ease of movement and agile instruction. This space is designed to provide students with a flexible and collaborative place for hands-on learning.

The layout shown is illustrative of basic concepts and spatial needs and should be adjusted according to each campus' specific requirements. The number of bays required is the fundamental design module. Precision Agriculture is in addition to the overall Agriculture program, therefore additional space and outdoor facilities may be needed (see **Agriculture Lab**). Typically, industry partners offer apprenticeship programs and/or corporate training, occupying the space alongside regular academic programs. Verify and provide for any specific partner requirements.

Due to the large scale of the equipment being serviced, this lab has the largest overall space requirement of any lab within the Ivy Tech standards. This is somewhat offset due to the lab being largely industrial in design and finishes, so the cost per square foot space is much less than other infrastructure heavy spaces. Regardless, thoughtful, efficient design of this space is required to prevent the lab from becoming oversized.

As all programs in the AMEAS field quickly evolve and expand, so too, must the space they occupy. The Lab, the site, and all infrastructure shall be planned with flexibility in mind. Diesel and Precision Agriculture Labs are most successful when located at the rear of campus property, outside the common path of travel, and with direct access to growing fields.

When Precision Agriculture is planned, Outdoor facilities shall include, at minimum, adjacent fertile land totaling 10-15 acres (or more, for larger programs) and an exterior Bull Pen with a washing station. Exterior access from the Mechanic Shop shall be provided via large overhead doors to allow movement of equipment, machinery, and materials.

Support utilities such as 3-phase power and overhead exhaust systems are required.

SUCCESS FACTORS

Exterior Access and Maneuverability: Properly located and sized overhead doors are critical for moving heavy trucks and equipment in and out of the space. The site design must be carefully considered to allow for the large maneuvering radii of the equipment.

Safety: Due to the hazardous nature of this work, Diesel and Precision Agriculture Labs must be designed with safety as a top priority. The Labs must be outfitted with safety equipment and must comply with all relevant safety regulations and standards. Walkways through the space should be clearly marked, and equipment should be properly located to prevent harm.

Security: Vehicles, parts, and high value tools and materials may be subject to theft. Provide PSEP cameras in key locations of the Diesel and Precision Agriculture Lab, adjacent instructional spaces, and outdoor facilities.

Storage: Sufficient storage is essential. Secure rooms for tools, parts and supplies shall be supplemented by wall and cart storage in the labs.

GENERAL

All perimeter walls shall be full height to deck.

ADJACENCIES

Separate and/or adjacent space is required for the following: **Dyno Lab, Secure Storage, and a Precision Agriculture Classroom.** Additional spaces that may be required for the program, see **Agriculture Lab**.

ACOUSTICS

Diesel and Precision Agriculture Labs are naturally very loud spaces due to the activities in the space. Sound absorbent panels on walls and ceilings are a requirement for noise reduction. STC-rated walls and Corridor buffer zones shall be used to decrease sound transmission to adjacent classrooms. Consider abuse resistance for panels below 8' A.F.F.

Where the Mechanic Shop borders acoustically sensitive spaces, exterior walls should have a minimum STC rating of 50.

MECHANICAL

A ducted overhead vehicle exhaust system shall be provided at each maintenance bay. Electrical service, compressed Air, Gas, and Water shall be distributed within accessible reach at each bay. Provide overhead drops in high bay areas. Distilled/ Reverse Osmosis water supply may be required. Verify specific needs on a project-by-project basis while planning for flexibility in the future.

- Outside ventilation and exhaust fans (plastic and metal) are required.
- Provide hose bibs, a utility sink with foot pedal or sensors, and emergency shower with eye wash in the main Automotive Lab.
- Provide floor drains/ trench drains in locations as required for certain equipment. A trench drain shall be centered along the length of the main Mechanic Shop.
- Provide an oil/ water interceptor and separator with cleanout outside the building.

ELECTRICAL & DATA

- Provide flexibility for 120/208V 3-Phase and 240V. High voltage service may be required. Verify required voltages with planned and future equipment.
- Emergency shut-off switches are required at each bay for lifts, air compressors and other equipment as determined by program.
- Consider opportunities for alternative energy sources such as wind and solar.

Provide power and data at 6' intervals or in raceways along perimeter walls at locations which may be used for desktop computer workstations and/or lab equipment.

LIGHTING

Proper light levels are crucial in Diesel and Precision Agriculture Labs.

- In high-bay areas, provide LED lighting in warm, soft white color.
- Task lighting is required at individual bays and workstations.

TECHNOLOGY

Students regularly use laptop computers to run diagnostic software and for reference. Wifi connections are critical, and hardwire connections may be required for certain equipment.

- Provide Wireless capability throughout with Wireless Access device.
- Consider Building Automation technology and security/ alarm systems in select areas.
- Provide telephone service.
- Provide high-speed internet throughout, with dedicated data connections for Smart TV and additional equipment as identified by the program. Verify specific requirements.
- PSEP cameras are required throughout the labs and outdoor facilities.
- Provide card reader/ key fob at entry doors and storage rooms.

ACCESSORIES AND EQUIPMENT

Equipment needs should be determined on a project-by-project basis while planning for flexibility in the future. At minimum, equipment shall include:

- Heavy truck electric lifts, floor mounted, with emergency shut off
- Alignment Racks
- Diesel engine hoists
- Equipment on rollers for flexibility
- Air compressors
- Fire extinguishers
- Wall-mounted tack boards and marker boards

FURNITURE

Provide the following standard furnishings for Open Labs:

- Student lockers for storage of personal items.
- Work tables and job boxes on rollers for flexibility and mobility.
- Wall shelving and storage racks on perimeter walls.

FINISHES

Ceilings

Recommended Height: 20’ clear with exposed structure. Provide acoustic panels for sound absorption.

Floors

Polished or sealed concrete slab (6” min. thickness) with slip-resistant finish. Floors may be flat or low-sloped toward drains.

DOORS AND WINDOWS

Overhead doors for exterior access. 10'W x 12'H, typical interior overhead door. Large garage doors in the Mechanic Shop shall be 20'W x 18'H.

DYNO LAB

SPACE DESCRIPTION

The Dyno Lab is a specialized Lab space, open and adjacent to the Mechanic Shop, for testing engine performance. Verify equipment and requirements with the program before designing the space.

Due to the use of extremely loud equipment, wall construction requires high STC rating and sound isolation. Provide sound absorptive panels on walls and ceilings.

Provide all utilities as required by the program.

Proper lighting is critical and shall be achieved with a mixture of high-bay LED lighting and task lighting at work benches.

Provide direct access to an adjacent Secure Storage room and close proximity to Classrooms.

SECURE STORAGE

SPACE DESCRIPTION

The Secure Tool Storage room is a dedicated space, adjacent to or part of the Mechanic Shop, for the storage of specialized tools, air compressor and other utilities. Independent climate control is required. The space should be secured by walls, or secure fencing. A workstation with power and data may be provided for use by a lab technician for tracking tools and parts.

Provide key fob access.

Provide direct access to the adjacent Mechanic Shop and other spaces as needed per program requirements.

ACCESSORIES AND EQUIPMENT

Wall shelving and toolboxes on rollers.

PRECISION AGRICULTURE CLASSROOM

SPACE DESCRIPTION

(see **General Classroom**)

The Precision Agriculture Classroom is a dedicated lecture space for up to (16) students and (1) instructor. This is an adaptable space, similar to a General Classroom, with an overhead door for access to the Mechanic Shop and space for Precision Agriculture simulators. Provide 10' x 10' clear floor space and standard 120V power for simulators.