



## V. PROGRAM REQUIREMENTS – SPACE PROGRAM, ROOM DATA SHEETS, DIAGRAMS

### 1.0 INTRODUCTION AND OVERVIEW

#### A. Introduction

The proposed Center for Advanced Manufacturing Technologies will:

1. Replace existing inadequate program and classroom space with technologically advanced spaces designed specifically to support advanced manufacturing programs.
2. Allow colocation of CPTC’s advanced manufacturing programs in one building which will, in turn, provide opportunities for the cost-effective sharing of equipment and teaching resources between programs and for the development of innovative new programs to meet the future demand for manufacturing workers in the Puget Sound region.
3. Provide much-needed space to increase enrollment in key areas through special initiatives such as the new Mechatronics, Manufacturing Operations, and Engineering Technology programs.
4. Provide flexible space and access to equipment that will support the work of CPTC’s Division of Workforce and Economic Development with dislocated workers, transitioning veterans, vulnerable workers, and students pursuing programs that are not financial aid-eligible.

#### B. Methods & Process

During the programming process the D-B Support team met with the CPTC Administration, Facilities Management, and faculty. The focus of these meetings was to develop an understanding and definition of the functional and space needs of each program.

The functional and space program described herein was developed in a streamlined process under the guidance of the Department of Enterprise Services (DES), with considerable development provided by CPTC Administration and Faculty. Detailed program meetings were held with larger group of Stakeholders followed by program sessions with each of the major instructional functions. Physical tours of the existing labs and instructional spaces were conducted to identify the positive and negative attributes of their existing facilities. Subsequent meetings and site visits centered on identifying the specialized equipment needed in each of the programmed spaces.

The descriptions herein represent needs outlined by each of the CAMT programs and the results of interim discussions. The quantity and quality of building features required to meet functional needs are described. It is important to note that confirmation and further review/input by the users will be required during the design process.

#### C. Planning Goals

At the Stakeholder meetings the following were identified as the consensus goals for the project:

1. The project will provide a safe and secure learning environment
2. The new CAMT will be a facility that the faculty and students can be proud of. It should reflect its function and time. It will be a true center of campus
3. Provide an impressive student & professional environment.
4. Facilitate student engagement and interaction across programs
5. Provide for the broader student experience “outside” of the labs/shops
6. Maximize flexibility of space for inevitable change in the future



7. Without becoming strictly industrial, replicate the “real world”

**D. Planning Assumptions**

Throughout the programming and planning process, the following assumptions have been made that directly impact the project development function, form, schedule, and costs:

1. Building 22 will be demolished and the new building will be located on that portion of the campus.
2. The project will provide for extension of the campus Pedestrian Mall per the CPTC Master Plan
3. If funding permits, the project will provide for revisions to the Hageness Drive campus entrance as envisioned in the CPTC Master Plan
4. Placement of the new building should include relocating parking to the east where it could also be used for events at Building 23.
5. New construction will be made of durable materials and be complementary to the newer buildings on campus. Life expectancy will be 50+years.
6. The existing equipment at the current program shops will be relocated to the new building.
7. Programs have need for dedicated classrooms and labs but the shared classrooms/labs need to be available for common use and scheduling.
8. To facilitate a common community of educators, faculty offices and supporting administrative spaces should be collocated rather than distributed to the shop areas.
9. The new facility will be designed for flexibility and adaptability as well as to reflect manufacturing industry best practices. The labs are envisioned to be high bay spaces with utilities such as compressed air and power/data drops provided overhead on a suspended grid to provide flexibility for equipment placement.
10. A shared material loading area with wide abuse-resistant corridors facilitating regular material delivery to shops is desired. Some shops need direct access to exterior for larger material/equipment.
11. Circulation space can be used to create break-out spaces for informal study areas.
12. This project will be designed to meet or exceed LEED Silver certification.

## 2.0 SITE DEVELOPMENT AND OUTDOOR USES

### A. Site Planning

The proposed site is identified in the Campus Master Plan which was granted an Administrative Use Permit by the City of Lakewood in 2004. It is bounded to the north by Redwood Drive, to the east by a stormwater infiltration feature in the parking lot, to the south by the undeveloped pedestrian mall, and to the west by parking serving Building 23.

The site plan should be well-defined, coordinated and respond to the surrounding Lakewood Campus. The building shall be human-scaled at the sidewalk and open space levels. The pedestrian Mall and east edge of the site towards the Hagness Circle should be clean and well landscaped.



Existing Site Diagram



General site planning factors and requirements include:

**B. Building 22:**

The project included the demolition and removal of the existing Building 22 and its related utilities, paving, and supporting infrastructure.

On 04-18-2016, Northwest Abatement Services, Inc. performed an asbestos identification inspection to identify for visible Asbestos Containing Building Materials (ACM). The report is provided in Appendix D. The purpose of this inspection was to ascertain the presence of asbestos containing materials located in the structure and provide a report to conform to WAC 296-62077, PSCAA Regulation III, Section 4 and 40 CFR 763 requirements for identification of asbestos. This survey also satisfies regulatory criteria established by OSHA's Department of Labor and Washington State's Department of Labor and Industries for identifying asbestos containing materials associated with the structure for future abatement and demolition.

If requested by any proposer, the college will permit additional hazardous materials investigations in Building 22 as they may desire.

**C. Topography:**

A site survey was made in April 2016. It has been included in Appendix E. Existing grades within the project area are relatively flat. Once demolition is complete, the project assumes re-grading the project area to provide the building subgrade, asphalt parking and concrete walks.

**D. Geotechnical:**

Subsurface investigation was undertaken on behalf of the college in June of 2016. A copy of the findings is included in Appendix C. Interpretations and design requirements/guidelines for structural, civil, and utilities have not been included and are the responsibility of the proposer. If requested by any proposer, the college will permit additional site and subsurface investigations as they may desire.

**E. Utilities:**

Sanitary sewer and water (domestic and fire) is available at the site. Pierce County Utilities is the sewer purveyor, and Lakewood Water District is the water purveyor. It is anticipated that the project will include improvements. re-routing, and general upgrade to the existing sewer and water systems to accommodate the needs of the new building.

Provision shall be made for the connection of all required utilities and services, including water, natural gas, sewer, storm drainage, electrical, telephone and CATV. All utilities shall enter the site underground. All utility company requirements shall be determined and met. Meters shall be located conveniently for utility company staff. Meters are to be located in a weatherproof, protected area that does not provide access to utility controls.



**F. Stormwater:**

The existing soils within the campus are generally well-graded sands and gravels and are suited for storm water infiltration. It is anticipated that storm water runoff will be collected, treated, and infiltrated within underground infiltration trenches.

**G. Parking, Roads, and Signals**

The City of Lakewood has indicated that as part of the Land Use permitting for any new campus projects, an update to the 2014 Traffic and Parking analysis contained in the Master Plan will be required. The successful Proposer shall include all costs and efforts to meet this requirement in their proposal.

In the 2014 CPTC Master Plan, it is noted that the new CAMT project will result in the loss of 79 parking stalls. The existing parking on the site totals 170 spaces, 8 of which are accessible. In the design of the new site and the reconfiguration of the parking lots, it is preferred to minimize the loss of parking. Additionally, maintaining 2 accessible parking spaces in the vicinity of Building 25 with route to the building indicated is required. Parking shall comply with the City of Lakewood development standards and shall include landscape islands and stormwater infiltration via bio-infiltration systems located within planter strips between parking aisles, as has been typical in recent campus projects. ADA parking to meet code requirements and a drop-off area for private passenger vehicles should be provided, each with easy access to the front door.

In the 2014 CPTC Master Plan, Hageness Drive is modified to become Hageness Circle which will become the ceremonial main entrance to campus. Proposers shall provide for this modification as a bid alternate to the CAMT. Modification to Hageness Drive shall be included in traffic studies to identify if the City will require modifications to the signalization and channelization on Steilacoom Blvd.

**H. Pedestrian Mall and Outdoor Uses**

Extension of the existing Pedestrian Mall along the south edge of the project site is a requirement. The Pedestrian Mall is primarily made up of hardscape materials including colored concrete or unit pavers that can accommodate vehicular traffic for building maintenance and fire access. Paved areas are intentionally interspersed with plantings to add visual interest and soften the hard surfaces. Landscaping is also used to highlight entrances to buildings, provide a buffer zone between hardscape and buildings (minimum 5' deep), and to accentuate gathering spaces by providing raised planter seating along the Pedestrian Mall. The ideal width of the Pedestrian Mall is 60-80 feet, with allowances for a decrease in width when the preferred wider dimensions are not possible. Supplementing emergency vehicle (EV) access on adjacent campus roads, the Pedestrian Mall must provide an approved EV clearance of 24' wide by 13'-6" high extending to within 150' of all portions of the exterior of a building's first floor.

Important features of the Pedestrian Mall are courtyards and open lawn spaces that provide outdoor areas to pause and interact with others.



### 3.0 PROGRAM DESCRIPTIONS

#### A. General

Applied technical education marries the general academic and specific vocational preparation of students for jobs involving applied science and modern technology. It emphasizes the understanding and practical application of basic principles of science and mathematics, rather than the attainment of proficiency in manual skills that is properly the concern of vocational education.

Clover Park Technical College, with the new CAMT seeks to be the preeminent leader in providing unparalleled Applied Technology instruction in modern purpose-built facility where co-located manufacturing-related programs have access to state-of-the art equipment. Bringing together CPTC's manufacturing-related programs and workforce development activities in one building will enable the College to cross disciplines and develop new and innovative programs.

The programs that will occupy the proposed new building form part of a career ladder that CPTC is developing with local skill centers and high schools, including the Northwest Career and Technical High School located on the CPTC campus.

#### B. Programs

The new CAMT will house the following Applied Technology Programs:

##### 1. Manufacturing Technologies

The Manufacturing Technologies program has four different educational tracks, including:

- Manufacturing Technology Degree (AAT)
- Machinist Apprentice Certificate
- CNC Programmer/CATIA Certificate
- Machinist Helper Certificate

Students enrolled in the program receive a large amount of hands-on learning. Students build their knowledge base from the ground up, starting with simple topics like shop safety and culminating in more complex topics like learning to read numerical code.

Students who complete the program leave with a solid base on which to build their future careers. Jobs that students are qualified for upon the completion of their programs include becoming a Layout Worker or a Machinist.

Currently the Manufacturing program is in Building 25 of the Lakewood Campus

##### 2. Mechatronics

Mechatronics is a multidisciplinary subject combining mechanical engineering, electrical engineering, telecommunications engineering, control engineering, and computer engineering. This makes it applicable to a wide range of growing industries, including automation and robotics, advanced manufacturing, aerospace and transportation systems, instrumentation and process control, and supply chain and logistics equipment.

CPTC's AAS-T Mechatronics Technician degree provides the foundational skills needed to succeed in this exciting field. The program begins with courses that establish a solid base of



technical skills and an understanding of modern quality principles. Subsequent courses then build expertise in electrical systems, electronics (analog and digital), programmable logic controllers (PLCs), mechanical systems, sensors and actuators, pneumatics and hydraulics, and robotics.

Currently the Mechatronics program is in Building 25 of the Lakewood Campus

**3. Composites**

The Composites Program at Clover Park Technical College prepares students for careers in composites manufacturing. In this program, students learn to fabricate, assemble, repair, test and troubleshoot composite materials. The Advanced Composite Manufacturing Certificate is designed to prepare students to fabricate, assemble, and repair composite materials for a variety of industries, including aviation, automotive, marine and recreation. The knowledge and skills gained through this program are those required for entry-level positions as composite technicians.

Currently the Composites program is on the South Hill campus in Puyallup.

**4. Non-Destructive Testing**

The Nondestructive Testing (NDT) program at Clover Park Technical College provides training in a variety of analysis techniques used in industry to evaluate the properties of a material or structure without causing damage. Nondestructive testing techniques are used to examine structures or vehicles such as aircraft, trains, nuclear reactors, bridges, dams and pipelines.

This program prepares graduates to become active and successful professionals in nondestructive testing in a wide range of industries. Students will explore and receive hands-on technical training in blueprint reading, codes and specifications, composite fabrication, assembly and repair, materials and the manufacturing process. Training also includes the major methods of NDT, such as visual and optical, magnetic particle, liquid penetrant, radiographic, ultrasonic and eddy current testing, along with an overview of other methods. The students will be introduced to advanced technologies, such as ultrasonics (phase array and digital detector array DDA) and radiography (computerized radiography CR). Successful graduates are prepared with technical skills for entry-level positions such as quality control technicians, NDT technicians, engineering technicians and NDT equipment representatives.

Currently the NDT program is on the South Hill campus in Puyallup.

**5. BAS**

CPTC's new Bachelor of Applied Science in Operations Management (BAS-OPM) degree has been designed to meet the needs of students who want to move into supervisory and management roles in industry. While not requiring dedicated lab or classroom space in the new CAMT, many of the students pursuing this degree path will come from the CAMT programs. Additionally, the BAS program will use the general classrooms and computer labs in the CAMT.



**Clover Park Technical College**

**CENTER FOR ADVANCED MANUFACTURING TECHNOLOGIES**

**Request for Proposal**

**September 15, 2016**

**SECTION V – PROGRAM REQUIREMENTS**



4.0 SPACE REQUIREMENTS

The following tables show a summary of the functional area required for each program and the building as a whole:

CAMT SPACE SUMMARY		
Program/Space	Area	Notes
<b>Mechatronics</b>		
Classroom/Lab	1,000	
Fundamentals Lab	1,600	
Advanced Lab	1,200	
Tool room	300	
Storage	200	
<b>Manufacturing</b>		
Classroom/Lab	1,200	
Manufacturing Lab	4,000	
CNC Lab	9,600	
CNC Instruction/Demo.	400	
Cutting Lab	1,200	
Grinding Lab	700	
Inspection/QA lab	700	
Storage	1,000	
<b>Composites</b>		
Clean Room	1,300	
Staging Room	1,300	
Finishing Room	1,300	
Storage	800	
<b>Materials Testing</b>		
Classroom/Lab	1,000	
NDT Lab	5,000	Subdivided per data sheet
Storage	200	
<b>Shared</b>		
Classrooms (2)	1,800	each at 900-sf
Computer Lab	1,000	
Digital Collaboration Lab	1,000	
Student Study Lounge	400	
Receiving	300	Does not include covered storage area.
<b>Administrative</b>		
Faculty Offices (12)	1,440	120-sf each
Adjunct Faculty suites (2)	480	2 each shared space for 5 faculty
Workroom	240	
Conference	240	
<b>NET ASSIGNABLE</b>	<b>40,900</b>	
Structure	4,100	
Circulation	6,700	Includes corridors, stairs, vending alcove
MEP	9,300	include MEP, IT, etc.
Toilets & Janitorial	2,000	
<b>TOTAL GROSS</b>	<b>63,000</b>	



## 5.0 PROGRAM GOALS

The following goals for the facility have served to guide development of the building functional and space program:

### A. Student Satisfaction and Safety

Insuring students have a positive experience in the CAMT as well as protecting their health and safety are high priorities.

### B. Efficient Operations

The facilities must support the smooth flow of work through well planned adjacencies.

### C. Quality

A pleasant and conducive learning environment should be provided as one means of contributing to student success and faculty effectiveness. This implies access to daylight, quality finishes and appropriate acoustics.

### D. Flexibility

The facility should provide a high degree of flexibility to accommodate inevitable change in programs, equipment, processes, technology.

### E. Energy and Environment

The project is expected to be a high performance building attaining LEED Silver. Energy saving measures with reasonable life-cycle paybacks should be used (see Section IV. Design Program - Narratives for further sustainability goals and technical requirements). Attention must be paid to internal air quality, especially in the labs. (through material selection and mechanical system design).

### F. Active Design

To encourage student and faculty health and wellbeing, the project should encourage movement and healthy activities through strategies such as visible and attractive stairs, wayfinding signage that promotes stair use, and attractive open space.

## 6.0 Building Layout and Organization

### A. General

It is desired that the CAMT be configured in four zones: a public zone, an academic/ service zone and industrial zone, and a materials zone. Building layouts must provide floors that are of a sufficient size to allow efficient layouts of large lab/shops, without sacrificing access to day light and external views. Shared facilities, such as the shared conference rooms, classrooms, student lounge should be located in an area that is most convenient to all building users. Similarly, shared spaces on each floor should be centrally located and easily accessible.

### B. Building Zones

The CAMT configuration be organized into zones based upon at least three criteria: level of common use/access; interior volume/height of space; and need for acoustic separation. The four main zones include:

1. **Public zone;** with entrance lobby, vertical circulation, and student lounge. It is preferred that this main entrance be location on the east portion of the site with direct access to the pedestrian mall.



2. **Academic/Service zone;** includes the shared (general) academic classrooms, faculty offices and workroom, and conference room. It requires acoustic separation from the program labs/shops. Can be 2-level.
3. **Industrial zone;** The main program labs/shops and their related dedicated classrooms and support spaces.
4. **Materials zone;** This zone is exterior space used for the receiving, transfer, and storage of material used by the programs. Other than the receiving room, it is not included in in the GSF of the building as it is not enclosed. It does require either a loading dock or a material lift that may be covered (and attached to the building) for weather protection. The manufacturing program also has a 20 x 40 storage Conex that needs to be located in this zone. It is desired that this zone be located to the west of the site.

**C. Other Considerations**

1. **Lobby;** The main public entrance should be clearly visible from the Pedestrian Mall and Hagness easy to locate from nearby sidewalks and parking. General building signage in compliance with the Campus Master Plan Guidance shall be provided to identify the building and direct visitors on the site.

The lobby should be spacious with an attractive layout, seating, and coordinated colors corresponding to the overall image of the building. Materials should be durable for high traffic areas and help reinforce the College’s desired image for the building. Provision for display of student work and projects is desired.

2. **Wayfinding**  
It should be easy for students and the public to find the destinations they seek within the building. Provide a main be directories for each floor. Rooms should be identified with signs.
3. **Depth**  
In order to promote access to daylight the depth of the building should be studied closely. Daylight access may also be accomplished through the use of shallower wings and/or or clerestory windows, light monitors and/or skylights.
4. **Floor-to-Floor Height**  
Floor-to-floor dimensions should provide the maximum possible interstitial space for ease of access without compromising quality of the work area. Minimum of ten-foot floor-to-finished ceiling/ceiling features (lighting/equipment, etc.) is the minimum permitted and greater than ten-feet wherever possible and or noted.
5. **Mechanical, Electrical, Plumbing (MEP) Spaces**  
The program contains a space allowance for MEP systems. Included in this allowance are spaces for: electrical equipment (transformers, switchgear, MDP and other panels); telecommunication distribution racks (MDF/IDF); sprinkler risers; boilers; pumps; HVAC, controllers; and similar systems equipment. (this does not include MEP equipment required in the labs/shops). HAVC equipment can be located in internal to the building within this space allowance or it may be roof or ground mounted on the exterior of the building.

If HVAC equipment is located on roof-top, it shall be screeded, easily accessed via stairs (no ladders). If HVAC equipment is ground mounted mechanical equipment, it should be fully screened and located where any fumes do not interfere with adjacent operations. In all cases equipment shall be placed and designed to avoid objectionable noise and vibration.



7.0 ROOM DATA SHEETS

The following pages provide the detailed requirements for each of the programmed spaces as identified by the Building Committee and Faculty.

<b>Space Name:</b>	<b>MECHATRONICS CLASSROOM/COMPUTER LAB</b>
<b>Function:</b>	Classroom instruction in manufacturing process and operations
<b>Size:</b>	1000-sf 32 occupants
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Mechatronics Lab; (visual with relites if possible);  <i>Needs to be in proximity to:</i> Mechatronics Storage; Fundamentals Lab  <i>Needs to be totally separate from:</i> Grinding
<b>Finishes:</b>	Floor: Resilient rubber or linoleum Walls: GWB Base: 6" rubber Ceiling: ATC. Minimum clear height 10-ft
<b>Windows/Daylighting:</b>	Windows with roller shades
<b>Doors:</b>	Personnel door direct to Mechatronics Lab
<b>Security:</b>	Card key access
<b>Plumbing:</b>	None
<b>Special Space Conditioning:</b>	Air Conditioned
<b>Lighting:</b>	Typical classroom/computer lab lighting
<b>Power:</b>	Perimeter raceway to feed computer desks
<b>Communications:</b>	Data in raceway to feed to computers General instructional media (Data/Audio) with short-throw video projector. Wall Phone Clock
<b>Fixed Equipment:</b>	Horizontal sliding markerboards with storage casework below and open casework (adjustable) shelving behind. Tack boards Casework bookcases for reference library and printer



	Built-in lockable storage cabinets (2 at 3-ft x 7-ft h)
<b>Furnishings:</b>	16 computer desks (6-ft x 5-ft) in rows powered from adjacent wall. 32 task chairs 1 instruction workstation with task chair 1 instruction podium with stool
<b>Space Name:</b>	<b>MECHATRONICS FUNDAMENTALS LAB</b>
<b>Function:</b>	Introduction to basic workshop skills needed to fabricate parts and structures.
<b>Size:</b>	1,600-sf 25 occupants
<b>Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Mechatronics Storage  <i>Needs to be in proximity to:</i> Mechatronics Classroom, Mechatronics Lab  <i>Needs to be totally separate from:</i> NA
<b>Finishes:</b>	Floor: Hardened/sealed concrete with traffic area denoted with non-slip grey epoxy outlined with yellow stripping Walls: Impact-resistant to 8-ft. Base: 6" rubber Ceiling: None. Painted structure for light reflection. Minimum clear height 14-ft
<b>Windows/Daylighting:</b>	Desired. Can be clerestory or skylights.
<b>Doors:</b>	Personnel as needed 10-ft x 10-ft roll-up door
<b>Security:</b>	Card Key locking.
<b>Plumbing:</b>	See equipment lists and data Compressed Air drops at each equipment piece (150 psi) Emergency eye-wash, Service/utility/hand wash sinks (1)
<b>Space Conditioning:</b>	Air Conditioned Need to make sure there is good general exhaust. Snorkel exhaust at soldering stations (4) Particulate collection at grinding and cutting stations



- Lighting:** 50-100 fc at work level
- Power:** See equipment lists and data  
Provide minimum 25% spare panel capacity  
Need emergency one-button power shutoff to lathes, grinders, etc.  
Surface raceway/conduit is acceptable
- Communications:** PA/Intercom (loud enough to hear over machines).  
Data connection for each machine  
New portable instructor’s media cart with short-throw projection and markerboard
- Equipment:** See equipment lists and data
- Furnishings:** 3-ft x 6ft wood-topped workbenches (10) with shop stools (20)  
(4) Electronics/Soldering workbenches (8-ft x 3-ft each)  
(1) - computer workstation (on cart)  
(2) movable markerboards.
- Remarks/Comments:** The lab has 7 separate areas for hand-on project work:
1. Welding
  2. Milling/Drilling
  3. Turning/Lathe
  4. Sheet Metal forming
  5. Grinding/Finishing
  6. Cutting
  7. Soldering
- Configuration is preferred to have a central workbench area for instruction surrounded by 7 work areas at the periphery.



<b>Space Name:</b>	<b>ADVANCED MECHATRONICS/ROBOTICS LAB</b>
<b>Function:</b>	Training and practice exercises in planning, constructing, trouble-shooting mechatronic constructs and equipment.
<b>Size:</b>	1,200-sf 25 occupants
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Mechatronics Classroom; Mechatronics Storage  <i>Needs to be in proximity to:</i> Fundamentals Lab  <i>Needs to be totally separate from:</i> NA
<b>Finishes:</b>	Floor: resilient interlocking rubber floor tile. Nonconductive. Walls: Impact-resistant to 8-ft. Base: 6" rubber Ceiling: None. Painted structure for light reflection. Minimum clear height 14-ft
<b>Windows/Daylighting:</b>	Desired. Can be clerestory or skylights.
<b>Doors:</b>	Personnel doors Double 4-ft leaf 8-ft high for material transfer
<b>Security:</b>	Card Key locking Motion alarm
<b>Plumbing:</b>	See equipment list Compressed air drops (coiled) at each equipment piece (150 psi) Emergency eye-wash (1) service/utility sink (1) hand wash sink
<b>Special Space Conditioning:</b>	Air Conditioned
<b>Lighting:</b>	50-100 fc at work level
<b>Power:</b>	See equipment lists and data Perimeter raceway and overhead power reels
<b>Communications:</b>	Wall Phone with PA/Intercom Data connection at perimeter raceway
<b>Equipment:</b>	See equipment lists and data



**Furnishings:**

- (12) 3-ft x 6ft workbenches/Work tables
- (20) shop stools
- (4) computer workstation (on carts);
- (2) movable markerboards.
- (8) Rolling tool cabinets
- (2); rolling open shelved storage carts

**Remarks/Comments:**

Maximum flexibility for location of furnishing and equipment is desired.



**Space Name:** MECHATRONICS TOOL ROOM/STORAGE

**Describe Function:** Secure Storage of tools and high-value material

**Approximate Size:** 500-sf

**Functional Interrelationships:** *Needs to be directly adjacent to:*  
Fundamentals Lab,

*Needs to be in proximity to:*  
Mechatronics Lab, Mechatronics Classroom

*Needs to be totally separate from:*  
NA

**Finishes:** Floor: Hardened/sealed concrete  
Walls: Impact-resistant to 8-ft.  
Base: 6" rubber  
Ceiling: None. Painted structure for light reflection.  
Minimum clear height 14-ft

**Windows/Daylighting:** None

**Doors:** 8-ft x 8-ft double door suitable for pallet jack.

**Security:** Card Key access  
Motion Alarm

**Plumbing:** None

**Special Space Conditioning:** None

**Lighting:** Service-type

**Power:** Convenience per code

**Communications:** None

**Fixed Equipment:** 24" deep, 4-shelve high industrial shelving at perimeter

**Furnishings:** Portable project boxes (6) movable tool boxes (4)



<b>Space Name:</b>	<b>MANUFACTURING CLASSROOM/COMPUTER LAB</b>
<b>Function:</b>	Classroom instruction in manufacturing process and operations
<b>Size:</b>	1200-sf 24 occupants
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Inspection/QA Lab  <i>Needs to be in proximity to:</i> CNC Lab; Open Manufacturing Lab (visual with relites if possible); Student Study/Break; Student Lockers  <i>Needs to be totally separate from:</i> Grinding Room, Cutting Room
<b>Finishes:</b>	Floor: Resilient rubber or linoleum Walls: GWB Base: 6" rubber Ceiling: ATC. Minimum clear height 10-ft
<b>Windows/Daylighting:</b>	Windows with roller shades
<b>Doors:</b>	Personnel door direct to Inspection Lab and to Manufacturing lab
<b>Security:</b>	Card key access
<b>Plumbing:</b>	None
<b>Special Space Conditioning:</b>	Air Conditioned
<b>Lighting:</b>	Typical classroom/computer lab lighting
<b>Power:</b>	Perimeter raceway to feed computer desks
<b>Communications:</b>	Data in raceway to feed to computers General instructional media (Data/Audio) with short-throw video projector. See AV Narrative/Requirements Wall Phone Clock
<b>Fixed Equipment:</b>	Horizontal sliding markerboards with storage casework below and open casework (adjustable) shelving behind. Tack boards Casework bookcases for reference library and printer Built-in lockable storage cabinets (2 at 3-ft x 7-ft h)



**Furnishings:**

20 computer desks (3-ft x 5-ft workstation) in rows powered from adjacent wall.  
20 task chairs  
1 instruction workstation with task chair  
1 instruction podium with stool  
Printer station at built-in casework



<b>Space Name:</b>	<b>MANUFACTURING LAB</b>
<b>Function:</b>	Instruction on operation and procedures using multiple machine types in varied configuration: manual lathe; milling; cutting; press; drilling. Student project production.
<b>Size:</b>	4,000 Square Feet (area) Up to 20 occupants
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> CNC Lab; Storage  <i>Needs to be in proximity to:</i> Manufacturing Classroom; Inspection QA Lab; Grinding; Cutting Lab, Receiving  <i>Needs to be totally separate from:</i> General Academic
<b>Finishes:</b>	Floor: Hardened/sealed concrete with traffic area denoted with non-slip grey epoxy outlined with yellow striping Walls: Impact-resistant to 8-ft. Base: 6" rubber Ceiling: None. Painted structure for light reflection. Minimum clear height 14-ft
<b>Windows/Daylighting:</b>	If possible. Clerestory or skylights acceptable
<b>Doors:</b>	Personnel doors. 10-ft x 10-ft roll-up door suitable for forklift at exterior and between CNC Lab 4-ft leaf 8-ft high interior between this space and CNC Lab and Grinding Lab for material transfer
<b>Security:</b>	Card Key locking. Lay out equipment to maximize visual contact with instructor
<b>Plumbing:</b>	See equipment lists and data Compressed air Emergency eye wash
<b>Special Space Conditioning:</b>	Air conditioning Good exhaust\particulate collection/control. Direct exhaust hood over oven
<b>Lighting:</b>	50-100 fc at work level
<b>Power:</b>	See equipment lists and data Dedicated 3-phase 480 v power for all machines Provide minimum 25% spare panel capacity



	Overhead drops Surface raceway/conduit is acceptable. Emergency power off button
<b>Communications:</b>	PA/Intercom (loud enough to hear over machines)
<b>Fixed Equipment:</b>	See equipment lists and data
<b>Furnishings:</b>	Movable work tables (5) Movable tool boxes (5) Computer workstations cart (6); Open rack storage shelving (maximize)
<b>Remarks/Comments:</b>	Need overhead material handling crane with 2.5 ton-ton capacity. Maximum travel in lab. Separate 10x10 caged material storage area with racks; Separate 10 x 10 caged area for tool box storage Small machine repair area (8x8)



<b>Space Name:</b>	<b>CNC LAB</b>
<b>Function:</b>	Instruction on CNC operation and procedures using multiple machine types in varied configuration, Student project production.
<b>Size:</b>	9,600 SF 35 occupants
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Open Manufacturing Lab, CNC Demonstration Room  <i>Needs to be in proximity to:</i> Manufacturing Classroom  <i>Needs to be totally separate from:</i> Grinding
<b>Finishes:</b>	Floor: Hardened/sealed concrete with traffic area denoted with non-slip grey epoxy outlined with yellow stripping Walls: Impact-resistant to 8-ft. Base: 6" rubber Ceiling: None. Painted structure for light reflection. Minimum clear height 14-ft
<b>Windows/Daylighting:</b>	Desired. Can be clerestory or skylights.
<b>Doors:</b>	Personnel doors 10-ft x 10-ft roll-up door suitable for forklift between Manufacturing Lab. 4-ft leaf 8-ft high for material transfer
<b>Security:</b>	Card Key locking. Lay out equipment to maximize visual contact with instructor
<b>Plumbing:</b>	See equipment lists and data Compressed Air drops at each equipment piece (150 psi) Conditioned (soft) water to each CNC Emergency eye-wash, Service/utility/hand wash sinks (4)
<b>Special Space Conditioning:</b>	Air Conditioned Good exhaust
<b>Lighting:</b>	50-100 fc at work level
<b>Power:</b>	See equipment lists and data Dedicated 3-phase 480 v power for all machines (prefer overhead Busway for flexibility to the extent permitted by OH crane) Provide minimum 25% spare panel capacity



	Need emergency one-button power shutoff Overhead power drops, Surface raceway/conduit is acceptable
<b>Communications:</b>	PA/Intercom (loud enough to hear over machines). Data connection for each machine
<b>Fixed Equipment:</b>	See equipment lists and data
<b>Furnishings:</b>	(10) Movable work tables (10) Movable tool boxes
<b>Remarks/Comments:</b>	Need overhead material handling crane with 2.5-ton capacity with maximum travel in lab



<b>Space Name:</b>	<b>CNC INSTRUCTION/DEMONSTRATION</b>
<b>Describe Function:</b>	Direct instruction on CNC operation and procedures, separate from the Open CNC Lab. Peer-to-peer instruction.
<b>Approximate Size:</b>	400 Square Feet (area) 4-6 occupants
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> CNC Lab  <i>Needs to be in proximity to:</i> Open Manufacturing Lab, Manufacturing Classroom  <i>Needs to be totally separate from:</i> Grinding
<b>Desired Finishes:</b>	Floor: Hardened and sealed concrete Walls: Impact-resistant to 8-ft. Base: 6" Rubber Ceiling: None. Painted structure for light reflection. Minimum clear height 10-ft
<b>Windows/Daylighting:</b>	Not required
<b>Doors:</b>	Need double 4-ft leaf 8-ft high for material transfer
<b>Security:</b>	Card Key locking. Visual to Open CNC Lab
<b>Plumbing:</b>	See equipment lists and data Compressed air drops at each equipment piece (150 psi) Conditioned (soft) water to each CNC
<b>Special Space Conditioning:</b>	Air conditioned Good exhaust
<b>Lighting:</b>	50-100 fc at work level
<b>Power:</b>	See equipment lists and data Dedicated 3-phase 480 v power for all machines Need emergency one-button power shutoff. Surface raceway/conduit is acceptable
<b>Communications:</b>	PA/Intercom (loud enough to hear over machines) Data connection for each machine
<b>Fixed Equipment:</b>	See equipment lists and data



**Furnishings:**

- Movable work table
- Movable tool box
- Computer workstation (on cart)



<b>Space Name:</b>	<b>CUTTING LAB</b>
<b>Function:</b>	Instruction on very-high pressure water jet cutting. Student project production
<b>Size</b>	1,200 sf 4-6 occupants
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Open Manufacturing Lab, CNC Lab.  <i>Needs to be in proximity to:</i> Manufacturing Classroom  <i>Needs to be totally separate from:</i> Grinding
<b>Finishes:</b>	Floor: Hardened/sealed concrete with traffic area denoted with non-slip grey epoxy outlined with yellow stripping Walls: Impact-resistant to 8-ft. Base: 6" rubber Ceiling: None. Painted structure for light reflection. Minimum clear height 14-ft
<b>Windows/Daylighting:</b>	If possible. Clerestory or skylights acceptable
<b>Doors:</b>	Personnel doors. 10-ft x 10-ft roll-up door suitable for forklift between Open Lab. 4-ft leaf 8-ft high for material transfer
<b>Security:</b>	Card Key locking. Lay out equipment to maximize visual contact with instructor
<b>Plumbing:</b>	See equipment lists and data Floor Drain Compressed air Conditioned (soft) water Sedimentation grit chamber on drain lines (can be exterior)
<b>Special Space Conditioning:</b>	Air Conditioned Good exhaust
<b>Lighting:</b>	50-100 fc at work level
<b>Power:</b>	See equipment lists and data Dedicated 3-phase 480 v power for all machines Provide minimum 25% spare panel capacity Surface raceway/conduit is acceptable.



**Communications:** PA/Intercom (loud enough to hear over machines)

**Fixed Equipment:** See equipment lists and data

**Furnishings:** Movable work tables (2)  
Movable tool boxes (2)  
Computer workstation (on cart)



<b>Space Name:</b>	<b>GRINDING ROOM</b>
<b>Function:</b>	Abrasive grinding, sanding, finishing of manufactured pieces
<b>Size:</b>	700 Square Feet (area) 8-10 occupants
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Open Manufacturing Lab  <i>Needs to be in proximity to:</i> Cutting Lab  <i>Needs to be totally separate from:</i> CNC Lab, Manufacturing Classroom; Inspection/QA lab
<b>Desired Finishes:</b>	Floor: Hardened/sealed concrete with traffic area denoted with non-slip grey epoxy outlined with yellow stripping Walls: Impact-resistant to 8-ft. Base: 6" rubber Ceiling: None. Painted structure for light reflection. Minimum clear height 14-ft
<b>Windows/Daylighting:</b>	If possible. Clerestory or skylights acceptable
<b>Doors:</b>	8-ft x 8-ft double door suitable for pallet jack.
<b>Security:</b>	Card Key locking. Lay out equipment to maximize visual contact with instructor
<b>Plumbing:</b>	See equipment lists and data Floor Drain Compressed air Conditioned (soft) water
<b>Special Space Conditioning:</b>	Air Conditioned Good exhaust Particulate collection exhaust system
<b>Lighting:</b>	50-100 fc at work level
<b>Power:</b>	See equipment lists and data Dedicated 3-phase 480 v power for all machines where indicated Provide minimum 25% spare panel capacity Surface raceway/conduit is acceptable. OH drops o.k.
<b>Communications:</b>	PA/Intercom (loud enough to hear over machines)
<b>Fixed Equipment:</b>	See equipment lists and data



**Furnishings:** Movable work tables (2)  
movable tool boxes (2)

**Remarks/Comments:** Loud/noisy/dirty space.



<b>Space Name:</b>	<b>INSPECTION/QA LAB</b>
<b>Describe Function:</b>	Inspection of manufactured parts. Instruction on quality assurance process and procedures
<b>Approximate Size:</b>	700_Square Feet (area) 3-4 occupants
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Manufacturing Classroom  <i>Needs to be in proximity to:</i> Open Manufacturing Lab, CNC Lab.  <i>Needs to be totally separate from:</i> Grinding
<b>Desired Finishes:</b>	Floor: Hardened/sealed concrete Walls: Impact-resistant to 8-ft. Base: 6" rubber Ceiling: None. Painted structure for light reflection. Minimum clear height 10-ft
<b>Windows/Daylighting:</b>	None
<b>Doors:</b>	4-ft x 8-ft door into lab. Standard door into Classroom
<b>Security:</b>	Card Key locking. Visual to instructor
<b>Plumbing:</b>	Compressed Air
<b>Space Conditioning:</b>	Yes
<b>Lighting:</b>	50-100 fc at work level
<b>Power:</b>	Dedicated power doe equipment. Power raceway on wall
<b>Communications:</b>	PA/Intercom (loud enough to hear over machines. Data connections to each machine
<b>Fixed Equipment:</b>	See Equipment List
<b>Furnishings:</b>	Movable work tables (2) movable tool boxes (1) computer workstation (on cart) Stone-top industrial workbench Fixed workbench counter at perimeter Sliding markerboard with storage below and behind



<b>Space Name:</b>	<b>MANUFACTURING STORAGE</b>
<b>Function:</b>	Secure Storage of tools and high-value material
<b>Size:</b>	1,000 Square Feet (area): subdivided with caging half for tool storage and half for material storage 4-6 occupants
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Open Manufacturing Lab,  <i>Needs to be in proximity to:</i> CNC Lab, Manufacturing Classroom; Inspection/QA lab  <i>Needs to be totally separate from:</i> Grinding Room
<b>Finishes:</b>	Floor: Hardened/sealed concrete Walls: Impact-resistant to 8-ft. Base: 6" rubber Ceiling: None. Painted structure for light reflection. Minimum clear height 14-ft
<b>Windows/Daylighting:</b>	None
<b>Doors:</b>	8-ft x 8-ft double door suitable for pallet jack.
<b>Security:</b>	Card Key access
<b>Plumbing:</b>	None
<b>Special Space Conditioning:</b>	None
<b>Lighting:</b>	Service-type
<b>Power:</b>	Convenience per code
<b>Communications:</b>	None
<b>Fixed Equipment:</b>	Industrial shelving; wall-mounted Accubins. Maximize coverage
<b>Furnishings:</b>	(2) Movable work tables (2) movable tool boxes



<b>Space Name:</b>	<b>COMPOSITES CLEAN ROOM</b>
<b>Function:</b>	Instruction and preparation lay-up/laminate of composite pieces/material
<b>Size:</b>	1,300-sf Up to 16 of occupants Need 10x10-ft storage area separated by wire caging for securing tools.
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Lay-Up/Staging Room, Composites Storage  <i>Needs to be in proximity to:</i> Finishing Room, NDT Lab, Classroom  <i>Needs to be totally separate from:</i> NA
<b>Finishes:</b>	Floor: Hardened/sealed concrete Walls: Impact-resistant to 8-ft. Base: 6" rubber Ceiling: None. Painted structure for light reflection. Minimum clear height 14-ft.
<b>Windows/Daylighting:</b>	Clerestory or skylights
<b>Doors:</b>	Personnel doors. 6-ft double leaf for material transfer
<b>Security:</b>	Card Key locking Intrusion detection
<b>Plumbing:</b>	See equipment lists and data Compressed air drops to tables (overhead) and at perimeter of room. Emergency eye-wash Service/utility sink Hand wash sink
<b>Special Space Conditioning:</b>	Air Conditioned Negative pressure, horizontal flow; MERV 13 filtration of intake air
<b>Lighting:</b>	50-100 fc at work level
<b>Power:</b>	See equipment lists and data Overhead 110v drops to work benches Provide minimum 25% spare panel capacity



**Communications:** Wall Phone

**Equipment:** See equipment lists and data

**Furnishings:** Describe:  
(1) Cutting Table 6-ft x 6-ft with Teflon top  
(5) 3-ft x 6-ft workbenches with Teflon tops  
(16) stools  
(1) Instructor computer workstation (on cart)  
(1) movable video display/markerboard  
(6) 6-ft high double door storage cabinets  
(3) Fabric Racks 6-ft x 4.5-ft x 6ft on rollers



<b>Space Name:</b>	<b>FINISHING (DIRTY) ROOM</b>
<b>Function:</b>	Fabrication and finishing of composite material and pieces
<b>Size:</b>	1,300 sf 16 occupants
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Lay-Up/Staging Room, Clean Room, Composites Storage  <i>Needs to be in proximity to:</i> NDT Lab, Classroom  <i>Needs to be totally separate from:</i> NA
<b>Finishes:</b>	Floor: Hardened/sealed concrete Walls: Impact-resistant to 8-ft. Base: 6" rubber Ceiling: None. Painted structure for light reflection. Minimum clear height 14-ft.
<b>Windows/Daylighting:</b>	Clerestory or skylights preferred. Not required
<b>Doors:</b>	Personnel doors 6-ft double leaf for material transfer
<b>Security:</b>	Card key locking
<b>Plumbing:</b>	See equipment lists and data Compressed air drops at tables and at perimeter. Emergency eye-wash Service/utility sink Hand wash sink
<b>Space Conditioning:</b>	Air conditioning Table-top outflow exhaust to minimize VOC contaminants Exhaust from paint booth Dust collection system
<b>Lighting:</b>	50-100 fc at work level
<b>Power:</b>	See equipment lists and data Provide minimum 25% spare panel capacity Provide emergency one-button power shutoff.
<b>Communications:</b>	Wall phone/PA-Intercom (loud enough to hear over machines).



- Equipment:** See equipment lists and data
- Furnishings:** (24) shop stools  
(5) 6-ft industrial shelving units



<b>Space Name:</b>	<b>COMPOSITES LAY-UP/ STAGING ROOM</b>
<b>Function:</b>	Preparation of composite pieces/material for fabrication prior to placement in oven
<b>Size:</b>	1,300 sf 16 occupants
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Clean/Preparation Room, Composites Storage  <i>Needs to be in proximity to:</i> NDT Lab, Classroom  <i>Needs to be totally separate from:</i> NA
<b>Finishes:</b>	Floor: Hardened/sealed concrete Walls: Impact-resistant to 8-ft. Base: 6" rubber Ceiling: None. Painted structure for light reflection. Minimum clear height 14-ft.
<b>Windows/Daylighting:</b>	Clerestory or skylights preferred. Not required
<b>Doors:</b>	Personnel doors. 6-ft double leaf for material transfer
<b>Security:</b>	Card Key locking
<b>Plumbing:</b>	See equipment lists and data Compressed air drops at tables and at perimeter. Emergency eye-wash Service/utility sink Hand wash sink
<b>Space Conditioning:</b>	Air Conditioned Heat hood over oven and autoclave
<b>Lighting:</b>	50-100 fc at work level
<b>Power:</b>	See equipment lists and data Provide drops at benches Provide minimum 25% spare panel capacity Provide emergency one-button power shutoff
<b>Communications:</b>	Wall phone
<b>Equipment:</b>	See equipment lists and data



**Furnishings:**

- (9) Steel shop benches 3-ft x 6-ft, (18) stools
- (2) 6-ft storage cabinets of molds and tools
- (3) Fire-resistant storage cabinets, 6' high, one direct vented
- (4) Oven Racks 2-ft x 3-ft x 6-ft



<b>Space Name:</b>	<b>COMPOSITES STORAGE</b>
<b>Function:</b>	Storage of resins and consumable materials
<b>Size:</b>	180-sf
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Clean Room, Lay-Up/Staging Room  <i>Needs to be in proximity to:</i> Finishing (Dirty) room  <i>Needs to be totally separate from:</i> NA
<b>Finishes:</b>	Floor: Hardened/sealed concrete Walls: Impact-resistant to 8-ft. Demising can be welded wire fabric partitions Base: 6" rubber Ceiling: None. Painted structure for light reflection. Minimum clear height 14-ft.
<b>Windows/Daylighting:</b>	None
<b>Doors:</b>	6-ft Double leaf for material transfer
<b>Security:</b>	Card Key locking Intrusion Detection
<b>Plumbing:</b>	None
<b>Special Space Conditioning:</b>	Provide pre-packaged walk-in freezer to keep resins in temperature range
<b>Lighting:</b>	Convenience
<b>Power:</b>	General. See equipment lists and data for power to freezer Temperature alarms on freezer
<b>Communications:</b>	None
<b>Equipment:</b>	See equipment lists and data
<b>Furnishings:</b>	(5) 6-ft h x 3'-0" w x 2'-0"d 5-shelf industrial shelving units



<b>Space Name:</b>	<b>NDT CLASSROOM/COMPUTER LAB</b>
<b>Function:</b>	Classroom instruction in materials testing process and operations
<b>Size:</b>	1000-sf 32 occupants
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> NDT Lab; (visual with relites if possible);  <i>Needs to be in proximity to:</i> NDT Storage  <i>Needs to be totally separate from:</i> Grinding
<b>Finishes:</b>	Floor: Resilient rubber or linoleum Walls: GWB Base: 6" rubber Ceiling: ATC. Minimum clear height 10-ft
<b>Windows/Daylighting:</b>	Windows with roller shades
<b>Doors:</b>	Personnel door direct to NDT Lab
<b>Security:</b>	Card key access
<b>Plumbing:</b>	None
<b>Special Space Conditioning:</b>	Air Conditioned
<b>Lighting:</b>	Typical classroom/computer lab lighting
<b>Power:</b>	Perimeter raceway to feed computer desks
<b>Communications:</b>	Data in raceway to feed to computers General instructional media (Data/Audio) with short-throw video projector. See AV Narrative/Requirements Wall Phone Clock
<b>Fixed Equipment:</b>	Horizontal sliding markerboards with storage casework below and open casework (adjustable) shelving behind. Tack boards Casework bookcases for reference library Built-in lockable storage cabinets (2 at 3-ft x 7-ft h)
<b>Furnishings:</b>	16 computer desks (6-ft x 5-ft) in rows powered from adjacent wall. 32 task chairs



- 1 instruction workstation with task chair
- 1 instruction podium with stool
- Printer station at built-in casework



<b>Space Name:</b>	<b>NDT (NON-DESTRUCTIVE TESTING) LAB</b>
<b>Function:</b>	Hands-On training in non-destructive testing including: Visual; Liquid-Penetrant; Magnetic Particle; Eddy Current; Ultrasonic; and Radiographic Inspection
<b>Size:</b>	5,000 Square Feet (area) 50 occupants  Configured with two central workbench/teaching areas (24 students at (12) 3-ftx6-ft workbenches/ Each area to have a teaching station with movable marker board and computer cart.  One area will teach Visual, Magnetic, and Particle inspection and the other, Eddy Current, Ultrasonic, and Radiographic inspection. Shop areas surrounding the bench areas consisting of a testing area for each of the above noted functions. Penetrant line & Mag Particle Line: Totally open, ventilated, plumbed with Immersion Tanks (2) Dark room: 8x8' Processes x-ray film - prefab darkroom booth RX-ray reading room: isolated with 2 stations, computer and light boxes 10 x 10
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> NDT Storage  <i>Needs to be in proximity to:</i> Classroom  <i>Needs to be totally separate from:</i> Grinding
<b>Finishes:</b>	Floor: Hardened/sealed concrete with traffic area denoted with non-slip grey epoxy outlined with yellow stripping Walls: Impact-resistant to 8-ft. Base: 6" rubber Ceiling: None. Painted structure for light reflection. Minimum clear height 14-ft
<b>Windows/Daylighting:</b>	Desired (Except for darkroom and reading room)
<b>Doors:</b>	Personnel doors 10-ft x 10-ft roll-up door
<b>Security:</b>	Card Key locking Secure (shielded) cabinet for storage of radiographic material. BMs alarm on doors, motion alarm
<b>Plumbing:</b>	See equipment list



Compressed Air  
Emergency eye-wash  
Service/utility sink  
Hand wash sink  
Collection and treatment system to drain immersion tanks. 500-gal capacity of waste water storage (cannot go to drain)

**Space Conditioning:**

Air Conditioning  
Positive general exhaust.  
Provide table-top outflow exhaust to minimize VOC contaminants  
Direct exhaust from penetrant spray booth

**Lighting:**

50-100 fc at work level  
X-Ray reading room needs dimmable lighting

**Power:**

See equipment lists and data  
Provide minimum 25% spare panel capacity  
Need emergency one-button power shutoff  
Surface raceway/conduit is acceptable

**Communications:**

PA/Intercom (loud enough to hear over machines).  
Wi-Fi  
Clock

**Equipment:**

See list

**Furnishings:**

(26) 3-ft x 6ft workbenches with non-conductive, non-magnetic, non-porous worktop. Each table to have 110v single monument with 2 duplex power  
(52) shop stools;  
(2) Instructor computer workstation (on cart)  
(2) movable markerboards with fixed short-throw video projectors  
(5) 6-ft w x 6-ft high industrial shelving units



<b>Space Name:</b>	<b>NDT STORAGE</b>
<b>Function:</b>	Storage of high-value tools and equipment
<b>Size:</b>	200-sf Can be in wire mesh partition
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> NDT Lab  <i>Needs to be in proximity to:</i> Composites  <i>Needs to be totally separate from:</i> NA
<b>Finishes:</b>	Floor: Hardened/sealed concrete Walls: Impact-resistant to 8-ft. Base: 6" rubber Ceiling: None. Painted structure for light reflection. Minimum clear height 14-ft
<b>Windows/Daylighting:</b>	None
<b>Doors:</b>	8-ft x 8-ft double door
<b>Security:</b>	Card Key access Door Alarm, Motion detector
<b>Plumbing:</b>	None
<b>Special Space Conditioning:</b>	None
<b>Lighting:</b>	Service-type
<b>Power:</b>	Convenience per code
<b>Communications:</b>	None
<b>Equipment:</b>	None
<b>Furnishings:</b>	(5) 6-ft industrial shelving units (1) 4-ft x 4-ft radiography storage container (1) 4-ft chemical storage cabinet (1) 4-ft flammable material storage cabinet



<b>Space Name:</b>	<b>GENERAL-USE CLASSROOM</b>
<b>Describe Function:</b>	Classroom instruction in manufacturing process and operations
<b>Size:</b>	900-sf 30 Student
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> General Use Computer Lab  <i>Needs to be in proximity to:</i> Entry, Study/Break  <i>Needs to be totally separate from:</i> Grinding
<b>Finishes:</b>	Floor: Carpet tile Walls: GWB. Base: 4" rubber Ceiling: ATC @10-ft clear
<b>Windows/Daylighting:</b>	Yes, with roller shades.
<b>Doors:</b>	Standard 3-ft wide door. Provide 12" full height relite to one side with louver blinds
<b>Security:</b>	Card key access
<b>Plumbing:</b>	None
<b>Space Conditioning:</b>	Air conditioned
<b>Lighting:</b>	Typical classroom lighting, dimmable
<b>Power:</b>	2 double duplex floor outlets Standard duplex walls for typical convenience
<b>Communications:</b>	Provide 4 data ports in wall box tethered to instructor podium Overhead fixed mount video projector Clock Screen
<b>Fixed Equip, /Furnishings:</b>	(2) 8' markerboards, (1) 12' markerboard (1) 4-ft tack board (1) 8' projection screen, (1) ceiling-mounted projector clock (1) 4-ft AV/storage cabinet



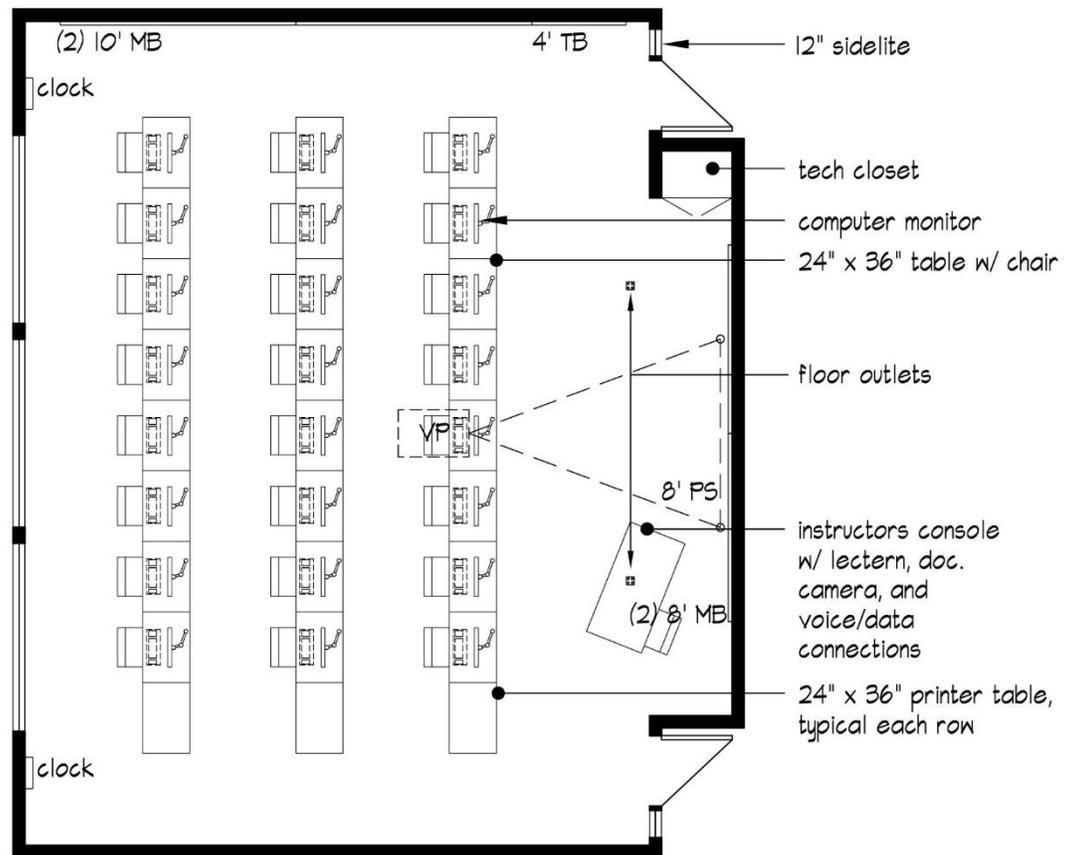


<b>Space Name:</b>	<b>GENERAL-USE COMPUTER LAB</b>
<b>Describe Function:</b>	Traditional digital instruction
<b>Size:</b>	1000 SF 24 Student
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Classrooms, Digital Lab  <i>Needs to be in proximity to:</i> Administrative Support, Faculty offices, Student Break areas  <i>Needs to be totally separate from:</i> Shops
<b>Finishes:</b>	Floor: Carpet tile Walls: GWB. Base: 4" rubber Ceiling: ATC @10-ft clear
<b>Windows/Daylighting:</b>	Yes, with roller shades.
<b>Doors:</b>	Standard 3-ft wide door. Provide 12" full height relite to one side with louver blinds
<b>Security:</b>	Card key access
<b>Plumbing:</b>	None
<b>Space Conditioning:</b>	Air conditioned
<b>Lighting:</b>	Typical classroom lighting, dimmable
<b>Power:</b>	Duplex convenience receptacles on wall per Code; floor receptacles for power to podium; floor/wall receptacles for connection to movable tables; power to AV equipment; duplex ceiling-mounted receptacle for projector
<b>Communications:</b>	Floor/wall receptacles for connection to movable tables, infrastructure at podium, ceiling-mounted receptacle for projector, jack for wall telephone Clock
<b>Fixed Equip, /Furnishings:</b>	(5) 8' markerboards (2) 4' tackboards, 8' projection screen ceiling-mounted projector (1) 3-ft storage and AV cabinet (30) 18"x18" cubbies for student bags/tools

- (1) Instructor podium (with adjustable height, controls for lighting and AV. Data and power connections.

**Furnishings:**

- (28) 24" d x 36" w computer tables
- (1) 24" d x 60" w teacher table
- (28) Student chairs
- (1) Instructor chair
- (1) Instructor Stool



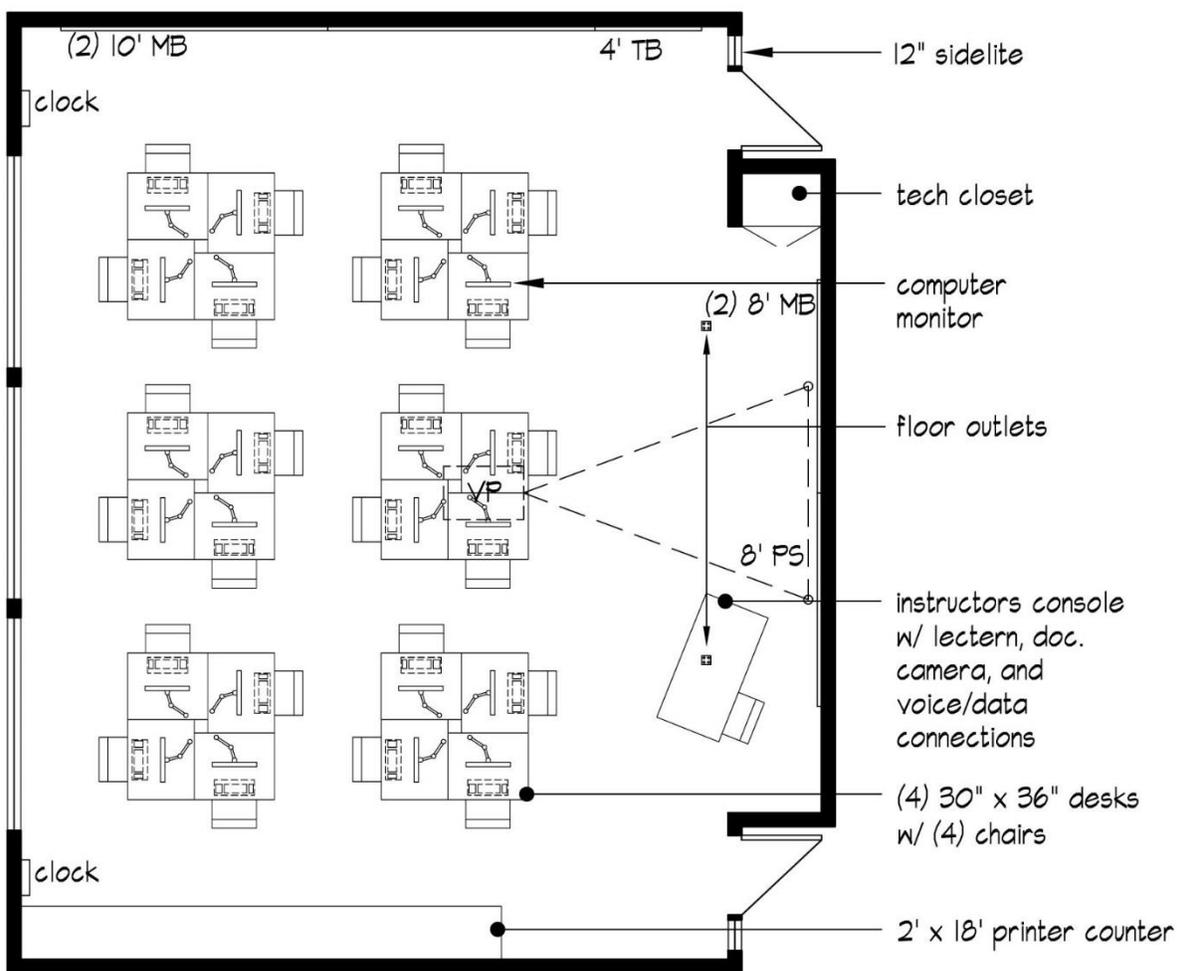


<b>Space Name:</b>	<b>DIGITAL COLLABORATION LAB</b>
<b>Describe Function:</b>	Collaborative digital instruction
<b>Size:</b>	1000 SF 24 Student
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Classrooms, Computer Lab  <i>Needs to be in proximity to:</i> Administrative Support, Faculty offices, Student Break areas  <i>Needs to be totally separate from:</i> Shops
<b>Finishes:</b>	Floor: Carpet tile Walls: GWB. Base: 4" rubber Ceiling: ATC @ 10-ft
<b>Windows/Daylighting:</b>	Yes, with roller shades.
<b>Doors:</b>	Standard 3-ft wide door. Provide 12" full height relite to one side with louver blinds
<b>Security:</b>	Card key access
<b>Plumbing:</b>	None
<b>Space Conditioning:</b>	Air conditioned
<b>Lighting:</b>	Typical classroom lighting, dimmable
<b>Power:</b>	Duplex convenience receptacles on wall per Code; floor receptacles for power to podium; floor/wall receptacles for connection to movable tables; power to AV equipment; duplex ceiling-mounted receptacle for projector
<b>Communications:</b>	Floor/wall receptacles for connection to movable tables, infrastructure at podium, ceiling-mounted receptacle for projector, jack for wall telephone Clock
<b>Fixed Equip, /Furnishings:</b>	(3) 8' markerboards, (2) 8' projection screen, (1) 4' tackboard, (2) ceiling-mounted projectors, movable rails for presentations (1) 3-ft storage and AV cabinet (24) 18"x18" cubbies for student bags/tools

- (1) Instructor podium (with adjustable height, controls for lighting and AV. Data and power connections.

**Furnishings:**

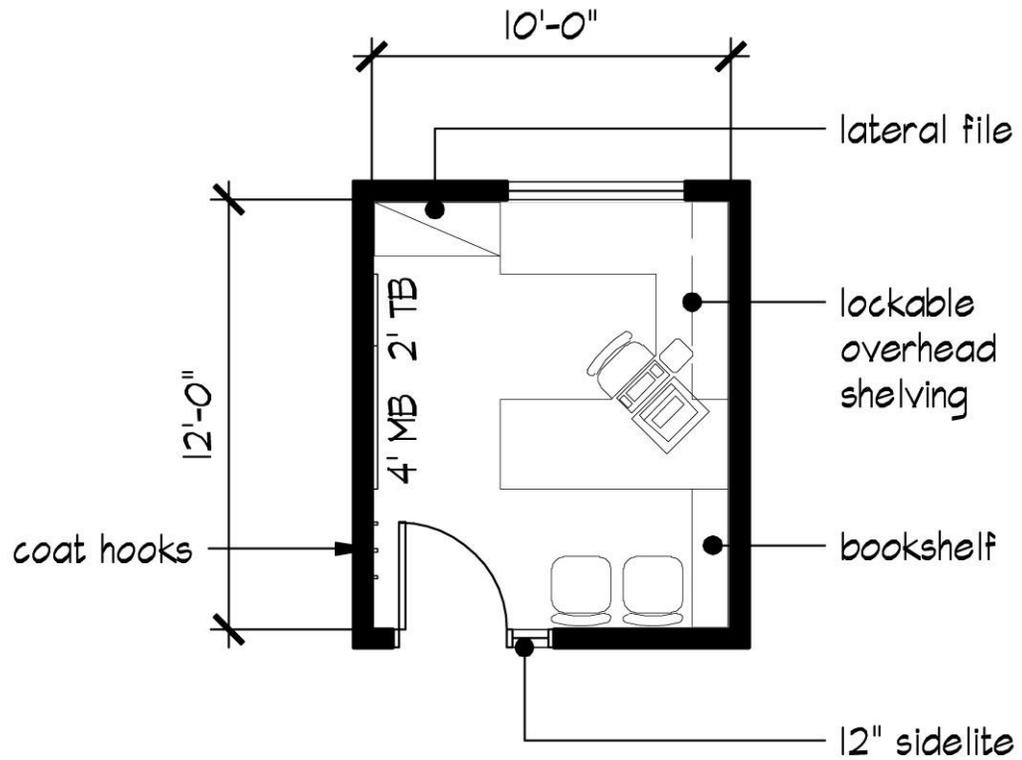
- (24) 24" d x 36" w computer tables
- (1) 24" d x 60" w teacher table
- (24) Student chairs
- (1) Instructor chair
- (1) Instructor Stool





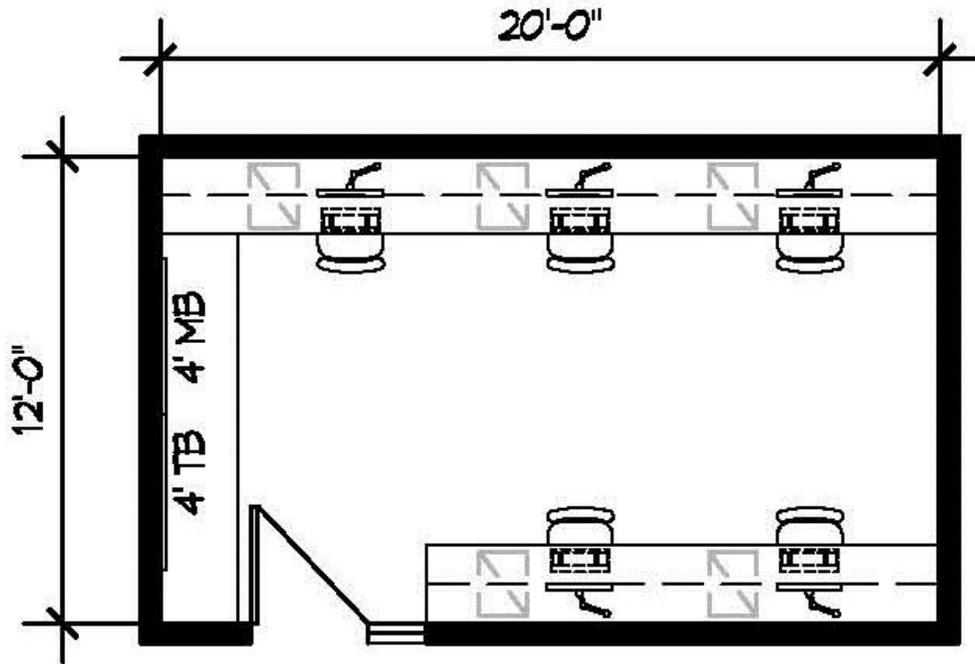
<b>Space Name:</b>	<b>FACULTY OFFICE (typical of 12)</b>
<b>Describe Function:</b>	Administrative space for faculty to prepare and plan instruction Student Support and counseling
<b>Size:</b>	120-SF
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Administrative Support, other Faculty  <i>Needs to be in proximity to:</i> General Classrooms  <i>Needs to be totally separate from:</i> NA
<b>Finishes:</b>	Floor: Carpet tile Walls: GWB. Base: 4" rubber Ceiling: ATC @ 9-ft-ft
<b>Windows/Daylighting:</b>	Yes, with roller shades. Special Controls? <u>Roller shades</u>
<b>Doors:</b>	Standard 3-ft wide door. Provide 18" full height relite to one side with louver blinds
<b>Security:</b>	Card key access
<b>Plumbing:</b>	None
<b>Special Space Conditioning:</b>	Air conditioned
<b>Lighting:</b>	Typical office lighting
<b>Power:</b>	2 double duplex 2 standard duplex on opposite walls
<b>Communications:</b>	Provide 4 data ports, 2 each on 2 walls
<b>Fixed Equipment:</b>	None
<b>Furnishings:</b>	Systems Furniture with 3-ft x 5-ft desk surface 18" side return 18" rear work surface, width of room. (1) 3 drawer tambour (1) 2-drawer lateral file 3-ft long, (1) 2 shelf bookshelf 3-ft long, (1) 2-ft x 18" x x6'fthigh locking coat/storage unit, (1) 3-ft wide x 6-ft h x 12" d bookshelf,

- (1) office chair
- (2) side chair



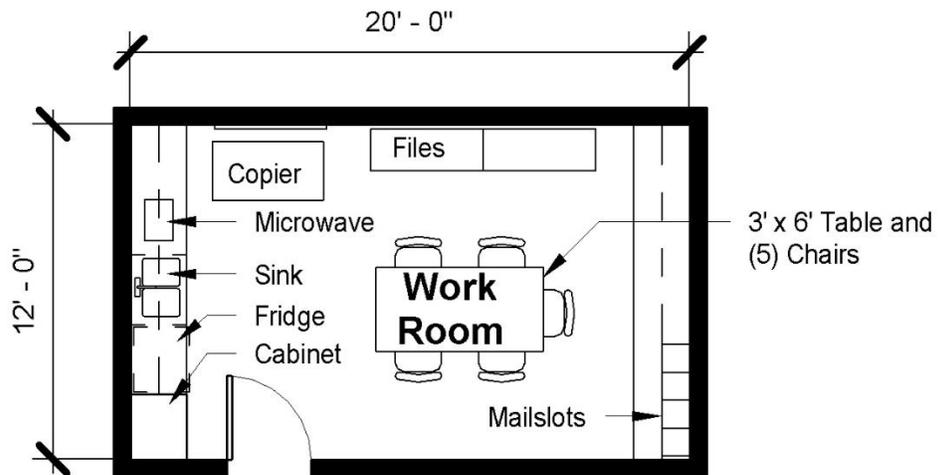


<b>Space Name:</b>	<b>ADJUNCT FACULTY OFFICE (typical of 2)</b>
<b>Describe Function:</b>	Administrative space for faculty to prepare and plan instruction Student Support and counseling
<b>Size:</b>	240-SF
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Administrative Support, Faculty  <i>Needs to be in proximity to:</i> General Classrooms  <i>Needs to be totally separate from:</i> NA
<b>Finishes:</b>	Floor: Carpet tile Walls: GWB. Base: 4" rubber Ceiling: ATC @ 9-ft-ft
<b>Windows/Daylighting:</b>	Yes, with roller shades. Special Controls? <u>Roller shades</u>
<b>Doors:</b>	Standard 3-ft wide door. Provide 18" full height relite to one side with louver blinds
<b>Security:</b>	Card key access
<b>Plumbing:</b>	None
<b>Special Space Conditioning:</b>	Air conditioned
<b>Lighting:</b>	Typical office lighting
<b>Power:</b>	6 double duplex 2 standard duplex on opposite walls
<b>Communications:</b>	Provide 6 data ports
<b>Fixed Equipment:</b>	None
<b>Furnishings:</b>	Systems Furniture with 3-ft x 5-ft desk surface (5) Desks



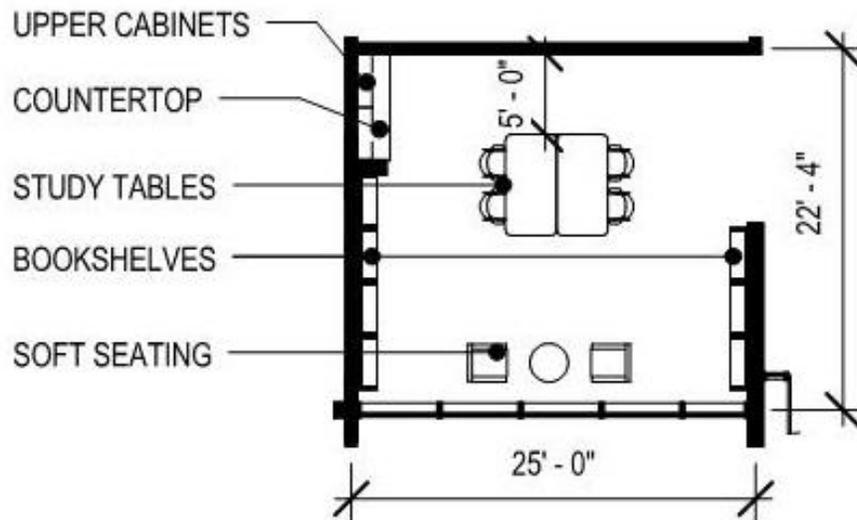


<b>Space Name:</b>	<b>FACULTY WORKROOM</b>
<b>Function:</b>	Administrative space for faculty to prepare and plan instruction
<b>Size:</b>	240-SF
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Faculty Offices  <i>Needs to be in proximity to:</i> General Classrooms  <i>Needs to be totally separate from:</i> NA
<b>Finishes:</b>	Floor: Carpet tile Walls: GWB. Base: 4" rubber Ceiling: ATC @ 9-ft
<b>Windows/Daylighting:</b>	Not required
<b>Doors:</b>	Standard 3-ft wide door.
<b>Security:</b>	Card key access
<b>Plumbing:</b>	Single compartment sink
<b>Special Space Conditioning:</b>	Air conditioned
<b>Lighting:</b>	Typical office lighting
<b>Power:</b>	2 double duplex 2 standard duplex on opposite walls
<b>Communications:</b>	Jack for wall telephone/data walls. Date for copier/printer
<b>Fixed Equipment:</b>	Wall and Base cabinets for storage. Mail slots for faculty and programs. (1) 4' Tackboard
<b>Furnishings:</b>	Copier Refrigerator Microwave 3x6 work table 4 chairs (2) 3-ft lateral files





<b>Space Name:</b>	<b>STUDENT STUDY/LOUNGE</b>
<b>Describe Function:</b>	Administrative space for faculty to prepare and plan instruction
<b>Size:</b>	400-SF
<b>Functional Interrelationships:</b>	<i>Needs to be directly adjacent to:</i> Circulation  <i>Needs to be in proximity to:</i> General Classrooms, Lobby  <i>Needs to be totally separate from:</i> NA
<b>Finishes:</b>	Floor: Carpet tile Walls: GWB. Base: 4" rubber Ceiling: ATC @ 9-ft
<b>Windows/Daylighting:</b>	Yes, with shade control
<b>Doors:</b>	None: Open to corridor
<b>Security:</b>	None
<b>Plumbing:</b>	Single compartment sink
<b>Special Space Conditioning:</b>	Air conditioned
<b>Lighting:</b>	Typical office lighting
<b>Power:</b>	2 double duplex 2 standard duplex on opposite walls
<b>Communications:</b>	Jacks for data. WIFI
<b>Fixed Equipment:</b>	12-ft Wall and Base cabinets 10-ft Bookshelves 4-ft display cabinet
<b>Furnishings:</b>	Under counter refrigerator Microwave above counter (2) 2x6 study tables (4) Soft Seating (1) occasional table





## 8.o INDUSTRIAL EQUIPMENT

### A. General

The majority of industrial equipment in the new CAMT will be relocated from the existing shops/labs serving the programs. The Manufacturing and Mechatronics labs are located in Building 25 on the Lakewood campus while Composites and NDT are in the main building at the South Hill campus in Puyallup.

### B. Existing Equipment Plans

The following plans identify the existing industrial equipment and its current location. Proposers will be provided access to the existing shops/labs to assist their team in understanding the equipment, its serving utilities, and its physical characteristics impacting its relocation.

### C. Program Equipment Lists and Data

The following lists identify the equipment which must be provided in the programed spaces for each of the four primary industrial programs. Each equipment is identified by number and description. Under the listing for Disposition, where equipment is listed as "Reuse", the successful proposer will provide for its disconnection at its current location, prepare the equipment for transport, move the equipment to the new CAMT and install in the location planned by the approved design.

Where equipment is listed as "New", it will be identified as either Owner-Furnished (OF) or Contractor-Furnished (CF). In all cases, installation will be by the successful proposer.

The work envelope must be used in laying out equipment in the proposed design. The subtotal area noted is only for the identified equipment and does not supersede the required area for the program as identified in V B. 4.o. Space Requirement.

Plans and lists follow.