

Miami University
School of Engineering and Applied Science

Department of Engineering Technology

Laboratory Plan

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I. Introduction

The department offers two associate degree programs and one baccalaureate program (two concentrations) in Engineering Technology each with their distinctive laboratory needs. This document addresses the laboratory plans as a department as well as the specific needs and plans for the programs.

Engineering Technology operates just over 11,000 sq. ft. of laboratory space located in Phelps Hall on the Hamilton campus and Thesken Hall on the Middletown campus. These laboratories can be grouped into five focus areas:

1. Computer Aided Design and Analysis
2. B.S./Engineering Science
3. Electrical/Electronics Systems
4. Materials and Manufacturing
5. Networking and Data Communications

In addition to housing the basic technical equipment and software required to teach the fundamentals of electrical and mechanical engineering technology, these laboratories are home to equipment and software not found in many two-year technology programs.

All of the electrical and mechanical courses require laboratory work as part of the instructional plan. These laboratories consist of activities ranging from the introductory use of instruments to designing and building automated control systems. Most laboratory assignments require one to two weeks for completion yet some may require a full semester.

II. Department Philosophy of Purpose on Laboratory Utilization

Laboratory work is expected of all Engineering Technology students. Faculty require formal lab reports for many laboratory assignments which are graded for technical accuracy as well as grammar, punctuation, and spelling. Engineering Technology Laboratories and classroom lab assignments are designed to:

- Provide students with hands-on experience in basic and advanced areas of electrical and electronic circuits, digital and microprocessor systems, computer networking, electric machines and controls, manufacturing processes, materials testing, thermodynamics, fluid mechanics, and machine design.
- Develop students' skill and creativity related to the creation of engineering drawings through the use of computer software.
- Strengthen students' skills related to working with others in teams.
- Strengthen students' effectiveness at oral and written communication through in-lab interaction.
- Strengthen students' skill in effectively documenting and presenting their ideas, designs, and lab results through technical reports presented orally and in written form.
- Provide students with a relatively risk-free environment where they can explore and analyze ideas, solve problems--some of which are open-ended, explore emerging technologies, discover new ideas, think critically, and experience the synergy and challenges that occur when working in teams.

III. Laboratory Pedagogy by Program

The Engineering Technology programs offer laboratories with two separate but mutually inclusive objectives:

1. *To teach fundamentals in science and **engineering**.*
2. *To train students in the latest **technology**.*

For the most part, labs in 100 level courses tend to emphasize basic fundamentals, 200 level courses begin focusing on technology applications with some design, while 300-400 level labs tend to be more open-ended and design based. Leaders of the courses and associated labs are:

Electrical and Computer Engineering Technology (AD):

First Year (ENT 192, 193, and 196)

Summers and Seifired

Second Year (ENT 291,293,294, 295, 296, and 297)

Summers and Seifired

Mechanical Engineering Technology (AD):

CAD (ENT 135 and 235)

Drigel and Earley

Mechanical Analysis (ENT 271, 272, and 278)

Earley and Ranatunga

Materials (ENT 151)

Drigel

Manufacturing (ENT 152 and 252)

Speckert

Junior (300) and Senior (400) level labs tend to be more open-ended with an emphasis on creativity, problem solving, and design.

Engineering Science Labs and common courses

ENT 301, 310, 312, 316, 497, and 498

Hergert, Earley, Drigel, and Ranatunga

Electro-Mechanical Engineering Technology (BS):

Junior Level (ENT 311)

Hergert and Speckert

Senior Level (ENT 401, 407, 412, and 418)

Hergert, Ranatunga, and Narayanan

Mechanical Engineering Technology (BS):

Junior Level (ENT 314, 333, and 355)

Earley, Drigel, and Ranatunga

Senior Level (ENT 404, 415, 416)

Earley, Drigel, and Ranatunga

In order to ensure that the labs fully meet the department's vision, we assess students' satisfaction with their laboratory experience through regular course evaluations, surveys, and other tools and processes outlined in the Department's Assessment Plan. Through these assessment tools and processes we have discovered areas for laboratory improvement and enhancement. Our assessment plan provides for continuous improvement of our programs including the labs. Students tend to be satisfied with their laboratory experience.

Electrical and Computer Engineering Technology (ECET—AD) Pedagogy

The ECET labs seek to strike a balance between engineering fundamentals and applied technology. Current technology is reinforced by the inclusion (at the request of local industry) of wireless communication and local area networking labs into the curriculum. Science and engineering fundamentals are strengthened by the numerous ECET labs requiring students to analyze collected data, most often by a statistical (percent error) comparison between measured and calculated values. As an added tool, circuit modeling and analysis is used in first year courses to help students predict measured values on complex circuits. This software package is available in the Computer Aided Drafting and Electrical labs.

Almost every ECET lab requires students to write a report. This helps students to think critically and apply technical writing skills. Reports are done on a computer, most often using Word™. Excel™ is used as a spreadsheet program, with instructors taking time to show students spreadsheet calculating and graphing capabilities.

First and second year computer analysis is done with TINA™. In most courses, students model a circuit, simulate it with TINA™, then build and measure it in the lab.

Students work individually and in teams of two to three students. Working individually helps the student develop independent thinking and analysis skills. Working in teams help students engage with other learners and develop oral communication and teamwork. Earlier courses have more individual work and later courses more team work. Since some of the second year lab projects are rather complex and time intensive, it is important that students cooperate and participate equally in the lab experience.

Electro-Mechanical Engineering Technology (EMET—BS) Pedagogy

The EMET labs provide a balance between engineering fundamentals and applied technology. Current technology is reinforced through laboratories in instrumentation, process control, data acquisition, and design. Science and

engineering fundamentals are strengthened by the numerous labs requiring students to collect and analyze data, compare results to published standards, and submit completed technical reports. Through these reports, EMET students develop critical thinking and technical writing skills. Senior Design project provides a significant capstone experience in which the students are required to make use of all of their technical, analytical, creative and communication skills in the design, analysis, development, and presentation of a significant engineering project.

Students frequently work in teams. This teamwork enables the individual to interface with other learners and it develops the students' communication skills. Since some of the lab projects are rather complex and time intensive, it is important that students cooperate and participate equally in the lab experience. In senior design, the team arrangement is more structured and generally requires that students state their contribution to the project in the report.

Mechanical Engineering Technology (MET—AD and BS) Pedagogy

The MET labs provide balance and development in engineering fundamentals, applied technology, analysis, and design. Current technology is reinforced through laboratories in materials testing, computer aided design, computer aided manufacturing, engineering analysis, vibrations, mechanisms, heat transfer, and instrumentation. Science and engineering fundamentals are strengthened by the numerous MET labs requiring students to collect and analyze data, compare results to published standards, and submit completed technical reports. Through these reports, MET students develop critical thinking and technical writing skills. Reports are done on a computer, most often using Word™ for the written materials, Excel™ for charts and graphs, and AutoCAD™ and Solid Edge™ for all engineering drawings.

Students frequently work in teams. This teamwork enables the individual to interface with other learners and it develops the students' communication skills. Since some of the lab projects are rather complex and time intensive, it is important that students cooperate and participate equally in the lab experience. In senior design, the team arrangement is more structured and generally requires that students state their contribution to the project in the report.

IV. Current Situation

Engineering Technology occupies just over 11,000 sq. ft. of lab space housing equipment valued at approximately \$700,000. Later in this section is a chart summarizing the current lab space utilized by Engineering Technology. As previously mentioned, the department's laboratories can be grouped into four focus areas:

1. Computer Aided Design and Analysis
2. B.S./Engineering Science
3. Electrical/Electronics Systems
4. Materials and Manufacturing
5. Networking and Data Communications

The EMET and MET—BS programs makes extensive use of the BS/Engineering Science labs as well as several of the other labs. All programs make extensive use of the Computer Aided Design and Analysis labs and all programs require courses and make use of the labs that are primarily part of the other programs. The ECET—AD and the EMET-BS programs are the primary users of the Electrical/Electronics Systems labs and Networking and Data Communications lab. The MET—AD and BS programs are the primary users of the Materials and Manufacturing labs.

HUB Sites—Distance Learning:

Since 1998, the department has been developing an ever increasing distance learning program that includes connecting to hub sites using Interactive Video Distance Learning Equipment (IVDL) for instruction and providing access to our labs at remote sites. We have also built or purchased equipment that is located at these sites. That equipment is used to support our EMET-BS program and is not listed here.

The following is a description of each of the lab areas available on Miami's regional campuses (Miami Hamilton and Miami Middletown). Our lab technicians at each campus support all of these lab areas and software systems. The computer centers (IT Services), manage hardware and software for all computer labs.

Computer Aided Design and Analysis (103PHE and 106THH)

Lead Instructors: Ron Earley and Gary Drigel

Description:

The Computer Aided Design and Analysis laboratories are centered in 103 Phelps Hall in Hamilton and 106 Thesken Hall in Middletown. These labs each house 21 networked microcomputers. These computers are networked and are running current software for Computer Aided Drafting/Design (CADD), Computer Aided Manufacturing (CAM), and mechanical and electrical analysis, data acquisition, modeling, and more. The computer centers (IT Services), manage hardware and software for these labs.

Software available includes: (note—some software is installed on computers in labs other than 103PHE/106THH)

- AutoCAD™ and Solid Edge™—CAD software used in ENT 135, ENT 235, 272 and other ENT courses.
- Link-Up/BCX®—CNC software used in ENT 152 and ENT 252.
- PC-APT™—Computer assisted CNC programming package used in ENT 152 and ENT 252. Mfg. lab only.
- BobCAD/CAM™—CAD/CAM software linked with AutoCAD™ used in ENT 152 and ENT 252.
- Easy4®—Microprocessor simulator used in ENT 295.
- Working Model 2D™—Motion simulation and analysis software used in ENT 271, ENT 272, ENT 278 and ENT 314.
- ANSYS™—Mechanical modeling and analysis software used in ENT 355.
- Multisim Electronic Workbench™—Electrical analysis software used in most EET courses.
- MASM™—An assembler compiler used in ENT 295 and ENT 297.
- Meter Challenge, Digital Challenge, DC/AC Challenge, Transformer Challenge—Simulation software packages used in EET.
- CUPL—a Compiler for Logic Device Programmers
- MATLAB™—a math analysis package used in ENT 355
- LabView™—instrumentation/data acquisition software used in ENT 311, 416 and other courses
- Neuralware™—artificial intelligence/system modeling software
- Wonderware™—system modeling software
- Turbo C++™—C compiler used in most second year ECET courses and SAN 153.
- Visual C++™—Another C compiler available for use in ENT courses.

In addition, a variety of programming, graphics, word processing, spreadsheet, and database software is installed on the network.

Pedagogy:

These labs serve as a classroom or auxiliary resource for most ENT courses in the electrical and mechanical programs. These laboratory facilities provide the resources needed to:

- Integrate CAD throughout the curriculum.
- Integrate engineering analysis software throughout the curriculum.
- Facilitate word processing, spreadsheet, and data base software for technical report writing.
- Provide an environment for training and continuing education.
- Integrate the lab with the manufacturing area for CIM, CNC, CAD/CAM, and programmable controller software.
- Integrate programming languages throughout the curriculum.

B.S./Engineering Science (100 PHE and 10 THH)

Lead Instructors: Dave Hergert, Ron Earley, Gary Drigel, and Vipul Ranatunga

Description:

Serving the engineering science needs of the department, these laboratories house equipment for studying engineering materials, fluids, dynamics, vibrations, and thermodynamics (emphasis on heating, ventilation, and air conditioning). These facilities are home to:

- A variety of materials testing equipment such as hardness testers, tensile testers, impact testers and related equipment.
- Wind tunnel and paper coating machine
- Fluids trainers
- Vibrations and dynamics education systems
- Fully instrumented heat exchanger and refrigeration units.
- Pulse width modulation and servo trainers
- Data acquisition equipment
- PLC's and associated training equipment
- Diagnostic equipment such as meters, hand-held scopes, and more
- Stand alone and networked PC's.
- Interactive Video Distance Learning Equipment (IVDL) for instruction and providing access to labs at remote sites.

Pedagogy:

These laboratories are designed for demonstrations and hands-on activities.

- The fluids and thermodynamics receive heavy use in the BS program and a lesser degree of utilization in the associate degree programs. All of our programs use these labs for teaching, demonstrations, and projects.
- Two of the refrigeration units, the heat exchanger, fluid trainers, and wind tunnel have been instrumented for use in thermodynamics or fluid mechanics, process control, and related courses. Although primarily used in our BS program some associate degree students also utilize this equipment.
- Process control, data acquisition, control systems, and traditional engineering science principles are taught in these labs.
- IVDL equipment is housed in these labs enabling us to utilize distance learning to connect between our own campuses and other sites. The IVDL equipment also enables us to perform lab exercises at one site while viewing the action, collecting data, etc. at other sites.

Electrical/Electronic Systems (303PHE and 102/104THH)

Lead Instructors Bob Summers and Roger Seifried

Description:

The Electrical/Electronic systems labs include:

- A variety of fractional horsepower electric machines, ladder logic trainers, programmable controllers and the other requisite infrastructure to utilize these machines for labs on both campuses.
- Resistors, capacitors, inductors, diodes, transistors, and various TTL chips on both campuses.
- DVMs, VOMs, oscilloscopes, power supplies, frequency generators, scope-meters, and data analyzers.
- Stand alone and networked computer to support simulation and analysis software.
- Breadboards and wiring.

Pedagogy:

Serving the electrical and computer program, these labs house equipment for laboratory experiences in circuit analysis, analog and digital electronics, microprocessor technology, computer networks, and wireless communication. These labs contain the necessary equipment and supplies to provide:

- An environment for designing, building, debugging, and testing electric circuits required in all laboratory assignments.
- Resources for working on multi-week lab projects in second year ECET courses.
- Resources for extensive laboratory projects to independent study courses.
- Resources for training and continuing education.

Both the Electrical and Computer and Mechanical AD programs require a course in Circuit Analysis (ENT 192). The Electromechanical BS program requires ENT 192, 196, and 291 as prerequisites. Over the past few years, the coverage in lecture and labs of programmable controllers has increased with the addition of the ENT 296 course required for both the Electrical and Computer AD and Mechanical AD programs, as well as, the Electromechanical BS program and in selected BS level courses

Materials and Manufacturing (102PHE and 8/8ATHH)

Lead Instructors: Rob Speckert and Gary Drigel

Description:

These labs contain a variety of tools and equipment used in the discrete manufacturing of small parts, assemblies, and devices. Housed within these labs are:

- Manual lathes and milling machines
- EMCO MAIER CNC lathes and milling machines designed for training
- A variety of tools, small machines, and supplies
- One Bridgeport CNC Machining Center, several small industrial robots and some tabletop robots, and an automated conveyor system.
- Materials testing and sample preparation equipment.
- Stand alone and networked computer to support CAD/CAM, simulation, and analysis software.

Pedagogy:

These labs are used extensively in the ENT 151, 152 and ENT 252 manufacturing courses, the ENT 202 special problems courses, and occasionally in ENT 291 Industrial Electronics. As the course develops, we will also utilize this lab for ENT 407. Several BS level courses also make use of these labs. The major objective of these labs is to give students the opportunity to integrate computers in a manufacturing environment. This includes the use of computers for:

- Designing and manufacturing products
- Controlling manufacturing processes
- Combining programmable controllers, conveyors, and manufacturing processes into systems
- Collecting statistical data from a manufacturing environment.

As a result of the heavy emphasis of the steel industry in the area, Engineering Materials is a required course in our MET and EMET programs.

Networking and Data Communications (305PHE and 10aTHH)

Lead Instructor: Dave Hergert and Rob Speckert

Description:

These labs contain a variety of stand-alone and networked computers for use in PC maintenance and repair, software installation, networking, data communication and more. Housed within these labs are:

- Local and Wide Area Networking equipment and software
- Data communications equipment and software
- A+ Certification instructions equipment.
- Variety of diagnostics and testing equipment

Pedagogy:

These labs are used extensively for industry training in the A+ Certification, Network+ certification, and related courses. They are also used daily in a variety of ENT courses from all of our programs for various software applications to PLC programming to PC repair. The labs provide the necessary hardware, software, and diagnostic equipment to support disassembly and assembly of PC's and networks.

The following chart shows the level of usage of Engineering Technology laboratories.

-- means the lab is not normally used by this course. * indicates increased usage by this course is planned.

Course Numbers	Computer Aided Design and Analysis 103PHE (650 sq.ft.) 106 THH (1030 sq. ft.)	B.S./Engineering Science 100 PHE (1000 sq. ft.) 10 THH (900 sq. ft.)	Electrical/ Electronic Systems 303 PHE (1390 sq. ft.) 102 THH (1380 sq. ft.) 104 THH (615 sq. ft.)	Materials and Manufacturing 102 PHE (1750 sq. ft.) 8 THH (750 sq. ft.) 8A THH (300 sq. ft.)	Networking and Data Communications 305 PHE (900 sq. ft.) 10A THH (350 sq. ft.)
Electrical Engineering Technology—AD					
ENT137	-	-	Low	-	-
ENT192	-	-	High	-	-
ENT193	-	-	High	Low	-
ENT196	Low	-	High	-	-
ENT291	-	-	High	-	-
ENT293	Moderate	-	High	-	-
ENT294	Low	-	Moderate	-	High
ENT295	-	-	High	-	-
ENT296	-	-	High	-	-
ENT297	-	-	High	-	Moderate
Mechanical Engineering Technology—AD					
ENT135	High	-	-	-	-
ENT151	-	High	-	Low	Moderate
ENT152	Moderate	-	-	High	Moderate
ENT235	High	-	-	-	-
ENT252	High	-	-	High	Moderate
ENT271	Low	*	-	-	Low
ENT272	Moderate	*	-	*	Low
ENT278	High	*	-	*	Low
Electro-Mechanical and Mechanical Engineering Technology—BS					
ENT301	Moderate	Moderate	-	-	-
ENT310	Moderate	High	-	Low	-
ENT311	High	Moderate	Moderate	-	High
ENT312	Low	Moderate	-	Low	-
ENT314	High	Moderate	-	-	-
ENT316	Moderate	-	-	-	-
ENT333	High	-	-	-	-
ENT355	High	-	-	-	-
ENT401	High	High	High	-	Moderate
ENT404	Low	Moderate	Moderate	Moderate	-
ENT407	Low	High	-	High	-
ENT412	High	High	-	-	Low
ENT415	High	*	-	-	-
ENT416	Moderate	Moderate	-	-	-
ENT418	High	High	High	--	-
ENT497-498	High	High	High	High	Moderate

A description and plan for improvement for each laboratory area can be found later in this document.

In addition to academic instruction, the laboratories are also utilized for industry workshops and continuing education public subscription courses. Other departments such as English, Math, Systems Analysis, Nursing, and Business Technology also use the microcomputer labs (Computer Aided Design and Analysis area).

V. Evidence of Support

Engineering Technology has received the necessary support for laboratory equipment, software, and supplies from the university. (This funding comes through the Hamilton and Middletown campuses.) Over the past five years, ENT has made the following improvements in laboratories. Where a specific campus is not indicated, the items are shared between the campuses.

Focus Area	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
Computer Aided Design and Analysis (103PHE and 106THH)	Maintain site license for AutoCAD™ Also maintained ANSYS™, Solid Edge™, Working Model™ Microsoft Project™, CAM software, Neuralware Predict, Matlab, and Wonderware.	Maintain site license for AutoCAD™ Also maintained ANSYS™, Solid Edge™, Working Model™ Microsoft Project™, CAM software, Neuralware Predict, Matlab, and Wonderware.	Maintain site license for AutoCAD™ Also maintained ANSYS™, Solid Edge™, Working Model™ Microsoft Project™, CAM software, Neuralware Predict, Matlab, and Wonderware.	Maintain site license for AutoCAD™ Also maintained ANSYS™, Solid Edge™, Working Model™ Microsoft Project™, CAM software, Neuralware Predict, Matlab, and Wonderware. All EMET students now purchase Labview and a DAQ card.	Maintain site license for AutoCAD™ Also maintained ANSYS™, Solid Edge™, Working Model™ Microsoft Project™, CAM software, Neuralware Predict, and Wonderware. Matlab and LabView now available to students through university license.
Engineering Science (100 PHE and 10/10aTHH)	Interfaced fluid trainer in 10 Thesken to a PC Phelps and connected it so that data can be sent over the Web. Instrumented Wind Tunnel. Added several new pieces of equipment (conveyor, magnetic levitation, inverted pendulum, and transducer units) from OBR grant.	Continued interfacing equipment to PC's connected them so that data can be sent over the Web. Added welder. Added Feedback transducer trainers into labs for ENT 401.	Re-sealed HVAC unit in 100 Phelps and connected it so that data can be sent over the Web. Moved Wind Tunnel to Middletown. Refurbished 8,8A,10,and 10A Thesken. Received a donation of a Sontag Fatigue Tester from METCUT Research. Added several new tools boxes and tools.	Added vibration analysis equipment to 10THH and fully instrumented same. Purchased 7 Boe-Bot robotic units for ENT 401.	Added dynamic testing equipment to 10THH and fully instrumented same. Purchased 4 Quansar Servo Trainers for ENT 418. Built several PLC controlled tracks for Boe-Bot and Wonderware. Matlab and LabView now available to students through university license.
Electrical Electronics Systems (303/305PHE and 102/104THH)	Added 20 copies of Electronic Workbench. Purchased 2 new logic analyzers. Added 12 PC's to 102THH.	Bought 10 hand held Scope-meters and 10 table-top oscilloscopes. Bought Mitsubishi PLCs for 102 Thesken.	Add full network support to 12 PC's in 102THH.	Added microprocessor related equipment, including two EPROM programmers.	Added 2 PLCs and 5 seats of Allen-Bradley software.
Manufacturing (102PHE and 8THH)	Purchased supply of aluminum and cutting tools. Upgraded to latest version of CAM.	Added to new CNC machines and purchased Bob CAD/CAM software.	Replenished supply of aluminum and cutting tools. Upgraded to latest version of CAD/CAM Software. Moved ADEPT Robot to Hamilton and received GE robot on donation	Upgraded Bob CAD-Cam software.	Added 3-phase lab equipment
Networking and Data Communications 305 PHE and 10A THH	Added removable hard drives and dedicated servers. Incorporated client/server technology using Labview in ENT 311.	Established these labs as primarily dedicated to networking. Began working closely with CIT in further expansion. CIT received a grant to allow further development.	Using CIT grant, greatly improved the look, effectiveness, and technology in these labs.	Further enhanced network equipment.	Upgraded bridge and enhanced network hardware and software. Further expanded client/server technology in LabView.

VI. General Plans for Improvement

The following are general plans for continuous improvement of the department's laboratory facilities over the next few years. <ore detailed plans are presented in program meetings and reports.

ECET Plans for Improvement

- Query local advisory council as to their needs from graduates and how labs can be improved.
- Begin a lab assessment as to what kinds of labs are currently used in other ECET programs, and what is currently needed by industry. This is part of an ongoing discussion with the Advisory Council.
- Place a stronger emphasis on instrumentation in first year labs.
- Continue to upgrade and expand the Local Area Network Labs.
- Update the programmable controller labs
- Continue to evaluate lab assessment information.
- Add wireless communication.
- Repair and replace components and general ECET lab equipment (meters, power supplies, etc.)

MET-AD&BS Plans for Improvement

- Consult advisory council members for their recommendations regarding laboratory equipment and software upgrades and acquisitions.
- Maintain CAD,CAM, engineering analysis, project management, finite elements, and design software
- Purchase for review, several mechanical analysis packages compatible with Version 20 Solid Edge™ and Dynamic Designer™ for room
- Laboratory changes will be implemented as needed based on feedback from assessment tools.
- Consult advisory council members for their recommendations regarding laboratory equipment and software upgrades and acquisitions.
- Upgrade laboratory equipment used for materials testing and make recommendations for acquisition of new materials testing equipment.
- Design and implement a new mechanisms laboratory.
- Further develop a theme for integrating labs throughout the MET curriculum. This will include identifying one or more parts that will be designed in CAD and Mechanics courses then manufactured in CAM courses.
- Add additional instrumentation.
- Replenish supply of aluminum and cutting tools.
- Instrument equipment used in vibrations and dynamics

EMET- BS Plans for Improvement

- Consult advisory council members for their recommendations regarding laboratory equipment and software upgrades and acquisitions.
- Build additional process control equipment, including tracks for Boe-Bots, and place at distance sites.
- Instrument more equipment and connect to web.
- Upgrade Engineering Analysis, simulation, and modeling software.
- Laboratory changes will be implemented as needed based on feedback from assessment tools.
- Consult advisory council members for their recommendations regarding laboratory equipment and software

In 2008, faculty will begin a new five year lab plan. This will occur in conjunction with the department's and SEAS's strategic planning initiative.

LABORATORY USE

Scheduled lab use

When a lab is used during its scheduled time, the faculty member will remain present in the lab, insure that safety rules are enforced, order parts as needed, set up experiments, and ensure the lab is cleaned up after use. The faculty member may ask the Lab Technician to help with some of the activities.

Unscheduled lab use other than the CAD lab

Due to safety considerations, no student is permitted to work alone in the labs (with the exception of the CAD lab). Students must be accompanied by a lab partner familiar with the Engineering Technology Safety Policy. If students wish to gain access on weekdays between 9 A.M. and 5P.M. they may contact the Lab Technician. Outside of these times the students must notify the instructor two days in advance so he may notify security in writing. Security will then let students in when they arrive for the lab. In general, students should not operate the lathes, mills, or fractional horsepower motors without the direct supervision of a faculty member or a designated assistant.

Unscheduled CAD lab use

Students wishing to use the CAD lab outside of posted hours are encouraged to use another campus Computer Lab instead. These labs have most of the ENT software loaded on their network.

Laboratory Technicians responsibility

The Laboratory Technicians are responsible for maintaining all of the Engineering Technology laboratories, ordering materials for the laboratories, and for helping faculty use the laboratories effectively to teach their classes. The technicians are not responsible for instructing laboratory sessions. Though the Laboratory Technicians report to the Department Chair, they work closely with all faculty in assuring the faculty members labs needs are met.

VIII . Laboratory Safety

ENT Laboratory Safety Instructions

(An Emergency Response/Safety Flip Chart is located in each lab near the telephone)

The ENT Laboratories permit you to gain hands-on experience with materials, equipment, and hands-on procedures. Part of your assessment is based on your ability to work safely in the laboratory environment without risk to yourself or others.

Basic safety for all ENT lab areas includes:

- a. NO food, drink, or smoking in the laboratories.
- b. Avoid irresponsible behavior. Plan ahead. When working in teams, do not assume that the other people know what you are planning to do.
- c. Learn the location and proper use of all laboratory emergency equipment including the means for obtaining emergency medical assistance.

The emergency number is:

88-911 or just 911

--or-- Campus Security can be reached at

**53-222 on the Hamilton Campus
73-333 on the Middletown Campus**

- d. You are responsible for cleanup. When you finish, please put away everything you have used.

In all labs except the CAD lab:

- e. Work only in the presence of another who is familiar with the ENT safety rules and can help in case of a problem.
- f. Use the correct laboratory equipment. Find and use the proper manuals, specifications, and other instructional aids, tag, isolate, and report defective devices.
- g. You must use the safety equipment provided. Never operate machines or work with chemical without eye protection. Wear safety glasses if there is any risk of flying debris. Wear clothing that affords protection and will not cause a safety problem. Remove jewelry when working near electric machinery. Locate the emergency stop before starting a machine.

The essence of safety is thinking ahead about the possible consequences of your actions. If you are unsure about instructions, procedures, or an unfamiliar piece of apparatus, STOP AND OBTAIN ASSISTANCE. For the sake of everyone involved, do not ignore any potentially unsafe condition or behavior.