



Michigan Technological University

Electrical and Computer Engineering

Graduate Student Handbook

Fall 2017

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KEY ECE DEPARTMENT FACULTY AND STAFF

[Dr. Daniel R. Fuhrmann](#) – Department Chair

Office: 118 EERC, 7-2550, fuhrmann@mtu.edu

Final word on policies and financial support, primary person involved in selecting GTAs

[Dr. Glen Archer](#) – GTA Coordinator, Associate Chair

Office: 626 EERC, 7-2789, gearcher@mtu.edu

Coordinates all core labs and supervises GTAs, assigns GTA teaching schedules, office assignments

[Dr. Michael Roggemann](#) – Graduate Program Director

Office: 503 EERC, 7-2164, mroggema@mtu.edu

General guidance, admissions and qualifying exams

Dr. John Pakkala – Graduate Academic Advisor

Office: 514 EERC, 7-2868, jepakkal@mtu.edu

MS Coursework option academic advisor

Your Advisor – Key person who will most often chair your report/thesis/dissertation committee and give you specific guidance on courses, research, and professional development

Chuck Sannes – Lab Supervisor

Office: 727 EERC, 7-2134, cesannes@mtu.edu

Lab equipment repairs, materials, etc.

Mark Sloat – Research Associate, Safety Officer

Office: 725 EERC, 7-2134, mesloat@mtu.edu

Lisa Hitch – Business Manager and Technical Communications Specialist

Office: 235 EERC, 7-2627, ljhitch@mtu.edu

Keys and building access, financial matters

Joan Becker – Graduate Program Coordinator

Office: 117 EERC, 7-1995, jebecker@mtu.edu

ECE graduate programs, student payroll

Michele Kamppinen – Staff Assistant

Office: 121 EERC, 7-2550, mlkamppi@mtu.edu

GTA supplies, catering orders, duplicating (copies), faxes, reimbursements

Student Resources:

Graduate Student Government - See: <http://gsg.mtu.edu>

ECE Department Representatives:

Nihar Sunilkumar Brahmhatt nsbrahmb@mtu.edu

Prudvi Raj Kandragula pkandrag@mtu.edu

Nishchal Sharma nsharma1@mtu.edu

The above students will communicate information regarding travel grants, social activities, opportunities, research colloquium and other important information. They can be used as a contact to communicate suggestions, complaints, and help to answer questions

GETTING STARTED

Listed below are several items to assist you in your orientation at MTU and the ECE Department. Some require your personal attention; others are informational only.

INTERNATIONAL PROGRAMS & SERVICES OFFICE (IPS)

All international students are required to report to International Programs and Services, Administration Building, Room 200 if you haven't checked in already. Bring your I-20 or DS-2019, passport and visa.

HOUSING INFORMATION

On-campus: <http://www.mtu.edu/housing/> Off-campus: <http://usg.mtu.edu/usg/housing/>

HuskyCard: STUDENT IDENTIFICATION CARD

All students are required to have a HuskyCard for identification and swipe access to buildings, parking lots, and residence halls *if applicable*. HuskyCards are issued at the HuskyCard Service Center in the IT Service Center, 1st floor of the Van Pelt and Opie Library. **A valid government-issued photo ID is required**, such as a driver's license, a state ID or a passport.

DETERMINING YOUR FIRST SEMESTER COURSE SCHEDULE

Your first semester schedule should be determined in consultation with your advisor. If you do not have an advisor, you may choose courses by consulting the graduate course catalog (<http://www.mtu.edu/ece/graduate/courses/>) in your area of interest.

You should choose courses which will apply to the degree you are seeking by consulting the Graduate Student Orientation page <http://www.mtu.edu/ece/graduate/pdfs/Grad-Orientation-ppt.pdf> for details of degree course requirements. For example, if you are planning on the MS Plan D Coursework Option, then taking an EE course at the 3000-level would not count towards your degree. A typical schedule has one or more graduate or senior level courses in the interest area of the student.

Utilize the Graduate School's [Forms and Deadlines](#) webpage (bookmark this page). Use the ECE graduate student [self audit](#) (Excel spreadsheet), found on the [Graduate Advising webpage](#) to plan and record your progress. Start now and keep a copy on your computer. Read the directions carefully.

NOTE: ECE graduate students must maintain a university cumulative GPA of 3.0 or above.

REGISTRATION/SCHEDULING

You may register online using the [Banweb](#) system or register in person at the Registrar's Office, Room 130 of the Administration Building.

TUITION PAYMENT

After scheduling courses, go to [MyMichiganTech](#) to receive a copy of your schedule and tuition bill. You may pay your student bill online with American Express, MasterCard or Discover (2.3% transaction fee applies) or e-check, or at the Cashier's Office located within the Student Financial Services Center in the Administration Building. Note: Credit/debit card payment not taken at Cashiers Office or by phone.

For supported students only (GTA/GA/GRA): After scheduling courses, go to Banweb to view a copy of your schedule and tuition bill. Computer fees and tuition for up to 10 credits will be paid by the ECE department for fully supported students. You are responsible for the student voted fees such as the Student Activity Fee, and Experience Tech Fee, etc.

GTA/GRAs – IF YOU EXCEED 10 CREDITS, YOU WILL PAY THE EXTRA TUITION.

CONTINUOUS ENROLLMENT

Students must be enrolled every academic-year (fall and spring) semester until they complete their degree. "Completing" a degree means successfully completing all required courses, turning in all paperwork, and, if required by the degree program, defending and turning in a final version of a report, thesis or dissertation. Graduate students are not required to register for summer session in order to fulfill the continuous enrollment policy.

EMPLOYMENT INFORMATION

Michigan Tech Career Services at www.mtu.edu/career/students/ provides information that may assist students in locating employment.

International students ON-CAMPUS EMPLOYMENT

-International students must limit on-campus employment to 20 hours per week while school is in session.
NOTE: Students on J-1 visas must report on-campus employment to IPS.

-You cannot work off-campus without prior approval from IPS.

-You will need to apply for a Social Security Number if you have an on-campus job offer. Bring your job offer letter to IPS for further instructions.

APPLY FOR SOCIAL SECURITY NUMBER (SS# or SSN)

[IPS](#) has all the details on [employment options](#). Before accepting any kind of job, contact IPS to find out if your visa allows you to work, and about other forms and requirements that may be required including applying for a Social Security Number. Please request a receipt confirming the SSN application, and return re to Lisa Hitch, 235 EERC, if you have been hired by the ECE department.

PAYROLL/PAY CHECKS

Please see Lisa Hitch in 235 EERC to be set up on hourly payroll immediately upon hire in order to avoid a delay in pay. Pay disbursements are issued every two weeks. Direct deposit can be set up online in Banweb under Employees, Pay Information, Direct Deposit allocation.

Fellowship recipients are paid monthly as a non-payroll disbursement. Direct Deposit can be set up for non-payroll payments online in Banweb under Employees, Non-Payroll Direct Deposit Destination.

OFFICE ASSIGNMENTS

Office assignments are made by Glen Archer on a priority basis. PhD students and GTAs have the highest priority. Office assignments will be sent to all graduates by email. Keys to desks in graduate student offices may be obtained from Chuck Sannes or Mark Sloat in 727 EERC.

KEYS AND AFTER-HOURS ACCESS

During the first week of the semester, Lisa Hitch will order office/lab keys as needed. Swipe card after-hours access to the EERC building and computer labs will automatically be provided to all enrolled students. A key that opens all graduate student offices and the labs will be issued to each graduate student with an office. You will be notified by email when your key is ready to be picked up at Public Safety & Police Services, 206 MacInnes Drive (building 16 on campus map). You will need your MTU ID card (HuskyCard) to pick up your key. If lost, you will be charged \$100 for a replacement key.

VEHICLE REGISTRATION/PARKING

See the Transportation Services website at <http://www.mtu.edu/facilities/services/transportation/> for detailed information regarding the vehicle registration process, parking fees, and rules/regulations regarding parking. Vehicle registration/parking permit purchase is online at [Purchase Permit](#). Bring your vehicle registration and your picture ID to Transportation Services, 100 Administration Building, to pick up your parking permit. During off-hours (4pm-7am weekdays) and all weekend, core campus parking lots and parking meters are open for parking (exception is handicap and designated parking spaces).

WINTER PARKING RULES

To allow for snow removal, parking is prohibited on campus between 2:00am and 7:00am, from November 1 through April 30 (regardless of if there is/isn't snow on the ground). Exceptions: Campus housing residents may park in their designated lots.

Those needing to park on campus overnight can ask for and receive a special overnight parking permit from transportation services. If it is after 5 p.m. on weekdays, on a holiday, or on weekends, contact [Public Safety and Police Services](#) for parking permission.

If you have car problems and are unable to move your vehicle, contact Transportation Services at 487-1441 during regular business hours (8am-5pm, Monday-Friday), and after hours, holidays, and weekends call Public Safety before the 2:00 a.m. deadline at 487-2216.

MAILBOX & MAIL SERVICES

Mailboxes to collect student work are provided for Teaching Assistants on the 7th floor. See Michele Kamppinen in 121 EERC for a key.

PHOTOCOPYING (DUPLICATING)

See Michele Kamppinen in 121 EERC for direction/instructions.

FAX MACHINE

The ECE department will allow you to send and receive faxes. Our fax number is (906) 487-2949.

The fax machine is located in the ECE main office, 121 EERC.

LABORATORY POLICIES

Chuck Sannes is responsible for equipment use and laboratory procedures. Please refer to his memo concerning laboratory policies on page 15 of this handbook or contact him in 727 EERC if you have any questions.

MISCELLANEOUS

Listed below are some miscellaneous rules, suggestions and guidelines. Some have **strong penalties, so read them over carefully.**

FOOD/DRINK

Eating or drinking is prohibited in all laboratories and computer areas. Violators will lose computer and lab use privileges.

PERSONAL HYGIENE

You will be sharing space with others, so bathe daily and change and launder your clothes regularly.

WINDOWS/DOORS

There is a "No Open Window" policy in the ECE Department.

GRADUATE OFFICES

You may complement the MTU furniture in your office with your own, but do not move furniture from office to office without permission from Glen Archer. You may not live in your office. Do not prepare or store food in your office. If you are not on campus for a semester, inform Mr. Archer that you will not be here and leave your office in a neat condition. Upon leaving MTU for other than a summer semester, you must completely clean out your office. Keep your office neat at all times. If you will not be enrolled for a summer semester, you must inform Mr. Archer or you will lose your office.

EERC FIFTH FLOOR SOCIAL AREA

The fifth floor open social area (space 515 EERC) is available for students to meet and study. Please respect this area by cleaning up after yourself - there is no maid service. Please dispose of your leftovers/garbage, clean up any spills and/or crumbs after eating, and thoroughly wash and put away any dishes/utensils used. Do NOT leave dirty dishes in the sink; Do NOT put any food down the sink drain.

SMOKING

As of September 3, 2013 smoking is **prohibited** on campus.

ECE Graduate Teaching Assistant (GTA) Guidelines

International students must take the Language Assessment administered by the Center for Teaching and Learning to be eligible for a GTA position. Please contact the Center for Teaching and Learning at 487-1001 or stop by their office, Room 226 J. R. Van Pelt and Opie Library, to set up an appointment, or if you have questions about this assessment. For more information see: www.mtu.edu/ctl/for-graduate-teaching-assistants/language-assessment/

All students with current GTA assignments for the fall 2017 semester must attend the GTA training program offered by the Center for Teaching and Learning *AND* the ECE Department's GTA Workshop to be eligible for a GTA position.

All new GTA's are required to complete GTA training through the Center for Teaching and Learning during their first semester as a GTA. The most common way to complete this training is to enroll in a 1 credit, non-billable course (ED0510 - GTA Training) that will meet on either Monday or Wednesdays from 3-5 PM in MEEM, Room 405 during THE FIRST 7 WEEKS of each semester (09/05-10/20 this fall). Failure to complete ED0510 in the first semester will jeopardize your reappointment as a GTA. Information about curriculum is available at www.mtu.edu/ctl/for-graduate-teaching-assistants/curriculum/. This course can be enrolled by permission only. Contact Michael Meyer at mrmeyer@mtu.edu to register (include your M-number), or with questions.

A GTA must be enrolled for a minimum of 9 credits, except in summer when the minimum is 1 research credit or 1 course. All summer GTAs must be enrolled for at least 1 credit. Do not plan travel dates for semester breaks that will require you to leave before the semester concludes or return after the next semester begins. You are expected to be available and prepared for labs on the first day of the first week of the semester.

See Lisa Hitch in 235 EERC for payroll inquires.

See Michele Kamppinen in the ECE office, 121 EERC, for supplies.

You will receive occasional emails from our administrative staff. Ms. Hitch, Ms. Kamppinen, and Ms. Becker will not trouble you with inconsequential requests. If they send you a request by email, you are expected to respond promptly and courteously.

SUPPORT

Research-Only Mode (Reduced tuition rate): Research-only mode allows you to register for nine credits (full-time) at a reduced tuition rate. Students are eligible for full-time research-only mode at the start of the first semester following completion of the following required milestones:

Master's candidates - Must complete all required courses as well as the required number of credits for their degree (30 minimum). Final Degree Schedule (M4) must be received by the Graduate School.

Doctoral candidates - Must satisfactorily complete both their qualifying and dissertation proposal exams, as well as all courses required for their degree (as applicable). Final Degree Schedule (D5) and Report on Research Proposal Exam (D6) must be received by the Graduate School. Note: The doctoral candidate's home department must post all comprehensive/qualifying exam results into the candidate's Banner record.

You must complete the [Petition to Enter Research Mode](#) and submit the form to the Graduate School at least one week prior to the first day of classes in the semester you plan to enter Research-only mode to enter full-time research-only mode. Permission to enroll in a research-only course is granted by the Graduate School after the petition is approved. For more information and access to the petition form see: <http://www.mtu.edu/gradschool/administration/academics/policies-procedures/research-mode/> This policy helps faculty who are supporting graduate researchers on external funding and will help self-supported students remain full-time and international students who must remain full-time for immigration purposes.

Minimum stipend amounts effective Fall 2017:

Minimum stipend rate for MS students is \$6,800.

Minimum stipend rate for PhD students without an MS degree is \$6,800.

Stipends will increase to \$7,895 for PhD students with an MS degree; to \$8,243 for those who have passed their qualifying exams with or without an MS degree; and to \$8,593 for those who have passed their proposal defense exams with or without an MS degree.

To be considered a PhD candidate, a student must be enrolled in the PhD program and have either earned a MS degree or have passed the PhD qualifying exams (written and oral).

Summer semester compensation is controlled by the Graduate School.

The standard GTA teaching assignment is four two-hour laboratory sections or equivalent. Grading for labs, homework and reports is part of the work for each lab. A GTA is expected to work an average of 20 hours per week. There will be times when the operational requirements of the department, the skill requirements of the labs, and the individual schedules of all the GTAs will force an assignment to labs in more than one course. This is undesirable for everyone and every effort will be made to avoid it.

Support for MS candidates will be limited to four semesters, excluding summers. GTA support will only be available to MS candidates for their first two calendar years in the program, independent of the number of semesters they have been supported.

At the beginning of each semester, you will receive an initial feedback interview with Dr. Archer and/or the faculty member who will be responsible for the lab you are assigned. This feedback session will be documented on the Performance Feedback Worksheet (sample included in orientation folder). You will be informed of your specific responsibilities and the instructor's expectations at this time. This feedback process will be repeated at mid-semester in order to highlight successes in your performance. The midterm feedback will provide you with an opportunity to make corrections prior to the end of the semester evaluation. A final feedback session to recap and reflect on the semester will occur after the end-of-semester survey results are available. You will be asked to schedule an appointment with Dr. Archer to assess your performance and set the stage for the future. Successful performance in the lab is essential for your continued support as a graduate teaching assistant.

CLASS OR LABORATORY PREPARATION

Meet periodically as specified by the professor(s) in charge to discuss:

Course Outline

Lab Experiments

Homework Assignments

Examinations

Make-Up Procedures Grading

Pre-Lab Procedures

Perform each assigned laboratory experiment yourself before the class meets. This will ensure your ability to answer any questions students may have concerning the lab and that needed equipment is present and working. This step is critical to your success as GTA. Failure to perform this step will inevitably be detected by the students. They have an uncanny ability to detect when you are trying to bluff your way through the lab and it will reflect poorly on the student surveys at the end of the semester, and the quality of education you provide.

You must follow, as closely as possible, the prescribed program in each course. Discuss any deviations with faculty and other teaching assistants in the lab before you go ahead. GTA's in multi-section labs need to coordinate grading to have uniform grading practices.

Check all the lab equipment before the lab begins. After the lab is over, make sure all the equipment is accounted for and turned off. Either put each equipment item away neatly or restore it to its original position in the laboratory. The laboratory doors, cabinets, etc., should be locked at all times when the laboratory is not in use unless otherwise specified. Turn off all equipment at the end of each class period, including the computers. Shutting down the computers will refresh the configuration control software and get rid of any unauthorized student files before the next class period. This discourages cross talk between students that might be misunderstood as academic dishonesty.

Do not allow students to browse in the supply cabinets for components. Part of your preparation for the lab should be to locate the required components and make them available to the students. NEVER allow students to return components to the supply cabinet. If stock is low notify Chuck Sannes, 727 EERC, 7-2134. Do not leave it for another GTA to do. There are used component bins on the counter in the labs. Students should place all used components in the bins for reuse or disposal. Do not allow students to remove components from the lab.

LABORATORY PROCEDURE

For most lab courses – refer to the Canvas course at <https://mtu.instructure.com/login> for policy and curriculum information.

Safety and good lab practices should be constantly emphasized. Your course instructor will provide you with suggestions, which may include handing out “Safety Practices to be Observed in the Laboratories of the Department of Electrical & Computer Engineering.”

During the first lab meeting, the students should be informed of the grading and attendance policy. This is your first and best opportunity to set expectations. The professor in charge of the course will provide you with this policy. This must include a definition of and the penalty for cheating, late work, and unsafe behavior. Refer students to the Academic Honesty Link on the lab web site – show the video on the first day of class.

Any student repeating a course with a laboratory must repeat the laboratory as well as the recitation to pass the course. Work cannot be resubmitted from previous attempts.

No lab instructor should leave the lab unattended for long periods of time while experiments are being performed. If it is necessary to leave for more than five minutes, a qualified stand-in should be found.

You must maintain a current and accurate record of student attendance and grades.

The specified experiments for course are not to be changed, nor should any parts be omitted without the consent of the professor in charge. Of course, suggestions for improvements are always welcome.

At the discretion of the faculty in charge, short weekly quizzes (perhaps 10 minutes long) may be given on the previous week's experiments. These quizzes, along with a lab final (if given), should enter into establishing the final lab grade. Check with the professor in charge of the course for more information.

It is quite important to inform students the following week if their lab report was not turned in or if they are delinquent in any other way. Provide timely feedback on student progress.

Do not sign any cards to add, change sections, etc., for any student. Instruct them to make an appointment with Judy Donahue, ECE Undergraduate Advisor by contacting the ECE office at 487-2550, 121 EERC. Announce that any student enrolled in your lab, who is still enrolled in the course after the last day to drop without charge, will be billed for the lab even if they drop the course.

Inform your students that eating and/or drinking is prohibited in all laboratories and computer area.

GRADING PROCEDURES

The grading procedure for each laboratory is determined by the faculty instructor for the course. Grades, in general, should include performance in the lab, hand-in material from work done at home, attendance, short tests and possibly a lab final examination. The faculty coordinator will provide you with additional guidance.

The final lab grades are due on or before the time the final course exam is given. Always be prepared to justify the grades you give. All grades are maintained electronically using "Canvas". The professor in charge of the course will enable you to access the courses grade book. You will assign grades in consultation with the faculty instructor. Do not depart the local area until all of your grades are properly recorded in the course grade book and all final grades are submitted electronically.

Students should turn in their work in the laboratory or Canvas as specified, and all graded reports and other materials should be returned to the student in the same way. Laboratory reports are to be returned to the students in the next week. It is your responsibility to grade reports promptly. If, for some reason, students cannot turn in materials in the lab, tell them to use your mailbox on the EERC 7th floor. See Michele Kamppinen in 121 EERC to be assigned to a 7th floor mailbox. Note: this is different from your mailbox in the front office. **Do NOT ask the Office Assistants to hand materials out to the students and do not pile things in the halls.**

Laboratory grades may NOT be posted outside your door. Do not post grades or leave piles of graded work for students to browse through. Do not discuss grades of one student with another. Refer to FERPA: <http://www.mtu.edu/registrar/faculty-staff/ferpa/>.

Keep a record of student attendance. You must verify that students attending your lab are enrolled in your section. Occasionally students may request to work in your section to make up work from other sections; you may allow this if there is room available.

TEACHING HINTS

Treat the students with respect. Be polite to them. Avoid sarcasm. Don't lapse into crude or obscene language or profanity. You have an obligation to teach the students the proper mode of expression. Be precise, concise, and technically correct in your speech and demand the same of the students.

You are in a position of power, so avoid any appearance of abusing that power. Do not ask any of your students for a date. Do not accept offers for dates from your students. Avoid even the perception of unfair treatment in the classroom.

Respect the lab equipment and lab space you use and make sure the student treats the equipment and space with respect.

If you do not understand the theory of what you are teaching, you should seek faculty guidance. You should never go to class unprepared and uncertain of the theory upon which that class is based. You should strive to keep well ahead of the class.

Never try to bluff the students. If you don't know the answer, say so, but get the answer before you see the students again and make it a point to bring up the subject.

If a lab experiment that students are doing does not work properly, do not imply that it doesn't matter. Impress upon the students the need for careful analysis, laboratory skill and troubleshooting technique. Help them connect their lab experience with classroom theory and what they can expect in industry. Paint a picture of the future that includes them as a part of our industry.

Continuously **practice** and **preach** safety. Do not tolerate unsafe practice.

OTHER RESPONSIBILITIES

GTAs MUST be on campus beginning with the first week of the semester except for the fall, when they need to be here for the week prior to the start of the semester. You are expected to remain on campus until your last lab section meets and all of your grades are turned in. Do not submit your final grades electronically without consulting the lab coordinator.

Expect to teach your lab the first week of classes unless instructed otherwise.

All GTAs are expected to meet their classes suitably dressed, well groomed, and on time. (And stay until the lab session is over and/or all students are gone.)

No laboratories are to be canceled, except by the professor in charge of the course. If you know in advance that you are unable to meet your laboratory, you must find a substitute and inform the professor in charge of the course. In an emergency, notify the ECE office that you are unable to meet your laboratory.

All GTAs are expected to check their mailbox, MTU email, and Canvas messages at least once a day.

You are requested to reserve at least four hours a week for consultation with students having difficulties. The times selected for consultation should be announced to each section at the first class meeting and also posted on your office door. Office hours can be arranged to use lab, speak to Chuck Sannes about availability and post on lab door your office hours and the class open time is focused on.

Be sure to clearly specify all due dates for lab reports, etc., and also specify the penalty for late or missing material. This should be done well in advance of the due date.

All GTAs should determine the location of first aid kit, power sources, circuit breakers, fuses, fire extinguishers, fire call boxes, and anything pertaining to the safe and efficient operation of the lab prior to the lab meeting. You won't have time to do this in an emergency so take care of it before the first lab period.

Electrical & Computer Engineering Department Lab Policies & Procedures for GTAs/GRAs

The following policies and procedures for the Electrical & Computer Engineering Department must be observed:

1. Safety first:

Observe the policies and procedures in the ECE Dept. General Safety Information hand-out. Have a copy available for reference and if there are any questions contact the lab support staff in 727 EERC, other GTAs or faculty.

→GTAs – Make sure that the students are properly instructed and observe all safety procedures relevant to your lab.

→GRAs – Follow all safety procedures relevant to your lab and research.

2. Cleanliness:

The labs must be kept neat and clean, even research labs. This has been a major problem in the past and will be enforced with the support of the Department Chair. We give tours to many prospective students, faculty, and their families, along with dignitaries and potential donors. Clean labs are important not only for appearance, but also for safe and efficient operation.

→GTAs – Make sure that the students have cleaned-up their work area before they leave. Test leads are to be returned to their proper location on the lead racks. The coaxial leads with the grabber ends should be hung with the grabber ends facing up to keep them off of the floor, so they don't get stepped on or run-over by a chair wheel. If any equipment was moved it should be neatly returned to the proper location. Finally ensure that the benches are free of any papers, gum wrappers, parts, or other items that do not belong.

3. Security:

Make sure that all the lab doors and cabinets are locked when you leave. Some doors have closers on them, while others do not. Do not assume that the door is fully closed and locked, check to be sure. Be alert for unknown people wandering through the halls, or trying to enter the labs at night or on the weekends. We have had major thefts in the past that may have been prevented by an alert grad student. If there is a problem call Public Safety and Police Services at 906-487-2216.

4. Chemicals:

All chemicals must be properly labeled, stored and a SDS sheet must be available on MSDSONline. Any chemicals you use must be properly disposed of before you graduate or leave the department. This will be charged to your (your advisor's) account. See the ECE Department Safety Information document for further details or contact the lab support staff.

5. Food/Drink

Food or drink spills can lead to costly repair or replacement of lab equipment. Drinks such as soda can be corrosive to equipment and circuit boards, even water can cause a significant amount of damage.

→GTAs - **ABSOLUTELY NO EATING OR DRINKING** is allowed in the undergraduate teaching labs.

Students who bring food or drink into the lab should be asked to store it in their backpack, if available.

If they do not have a backpack, food or drinks with caps or spill proof lids may be stored on the floor by the bench they are using. No food, cans, bottles or cups are to be allowed on the lab benches.

→GRAs – Some advisors allow food and drink in their research labs, however do not have it near the Department equipment.

If a spill occurs, clean it up and report any damages to the lab support staff ASAP.

6. Parts:

→GTAs – Parts cabinets are located in the teaching labs. These cabinets are stocked with common parts necessary for the lab experiments.

o You are to give the students the parts that they need, DO NOT allow the students to take parts from the cabinet by themselves. Always double check the parts or have the students verify they have the correct part, sometimes the wrong parts get put into the drawers. The cabinets are to be kept locked whenever there is not a TA in the room.

o Parts for each week's lab should be placed in the yellow, green, red or black bins provided and a label placed on the bin with the part name and value. If more bins are needed, contact the lab support staff.

o Students who have circuits built on their breadboard, but do not finish the experiments during the lab period, may take their circuits with them to work on the circuit outside of the lab or during an open lab period. The exception to this is for expensive or limited supply components. These items are not to leave the lab. Examples of these are motors, large inductors, transformers, power resistors, some switches - **if you are in doubt ask Dr. Archer or the lab support staff.**

o When students are done with their parts, they should place them in the used parts bins. Used ICs should be placed in the black used parts bin which is anti-static. Used parts are not to be thrown away or returned to the parts cabinets. The lab support staff will sort through the used parts to determine which ones are to be thrown away.

o Check component supply levels for the labs ahead of time (preferably the week before the experiment) and verify that there will be enough for all the lab sections. You are responsible for notifying the lab support staff when parts are getting **low** (*before* there are none left), and we will replenish the stock.

→GRAs – We have some parts in stock, which we can supply to you as long as we have an account number to charge. Think ahead, very little can be bought locally and ordering parts takes time and next-day delivery is expensive. You should place orders under \$50 yourself and get reimbursed. If you have an order over \$50 and wish to order parts through us, we have departmental parts requisition forms in the office (727 EERC). Again, plan ahead and try not to place many small orders as shipping costs add up. Large orders must be placed using a university purchase requisition. See the lab support staff for details.

7. Tools:

→GTAs – All students should have their own lab tool kit which they receive in EE2112 or EE2174. If you need a tool kit, see the lab support staff to sign one out for the term. At the end of the term either return the tool kit or notify us that you will be using it for the next term.

→GRAs – The shop has tools that you can use in the shop or check out for short-term use. DO NOT remove any tools from the shop without permission from the staff.

8. Equipment:

Defective Equipment

→GTAs – Red-tag any defective equipment, include a description of the problem. Tags can be found in or on the instructor's desk or table. Put tagged equipment on the instructor's desk or table and inform the lab support staff. The equipment will not get fixed if we don't know about it. Email Chuck Sannes (cesannes@mtu.edu) once it is tagged.

→GRAs – Notify the lab support staff of equipment that needs repair.

Borrowing Equipment

Do not remove equipment from the teaching labs without permission. ANY equipment removed from a lab must be logged on the sign-out sheet on the door. If equipment needs to be taken out of the building, an equipment loan form must be filled out and approved by the lab support staff.

Purchasing Equipment

When purchasing equipment fill out a departmental parts requisition form. You or your advisor will need to provide an account number to be billed and the account manager must sign the form. Turn the form into the lab support staff. The lab supervisor will determine if the order can be placed using a credit card or if a university purchase requisition is necessary. If a purchase requisition is required, the lab supervisor will assist you in preparing and submitting the form to Purchasing.

9. Reference books:

Most companies have component and equipment data sheets on-line and many have application notes and technical papers on-line. We have a good supply of reference and data books in the shop (727EERC). You are welcome to use these books, however if you want to take them out of the shop they must be signed-out. Books are available in the Learning Center, 123 EERC, which are not to be removed from this room.

10. Keys:

The lab support staff has keys for the desks & cabinets in the labs and offices. If you need a key for one of these; write down the number on the lock and come to 727 EERC and we will sign a key out to you. Keys are to be returned when you no longer need them - whether you move within the department or leave the department. Room keys and master keys are handled by Public Safety and Police Services; see Lisa Hitch, 235 EERC, if you need to obtain one of these keys.

11. Fabrication:**Machine Shop**

The department has a machine shop in SB-12 EERC. The machine shop staff can fabricate or modify wood, metal or plastic items. If you need something fabricated or modified take a well-documented drawing to the machine shop. You will also need to provide an account index number to be billed for any parts or materials that we supply.

Printed Circuit Board

We can fabricate single and double sided circuit boards in the shop. If you are not familiar with the EAGLE CAD package and our fabrication requirements, we have "hand-outs" on circuit board layout and using the EAGLE CAD program. We will assist as needed. Once your design is complete, a Circuit Board Requisition Form must be filled out and submitted to the lab support staff in 727 EERC.

12. Software:

All software questions/problems should be directed to the IT User Support group (906) 487-1111, it-help@mtu.edu, or the help desk in the library, 1st floor.

13. Windows:

There is a "No Open Window" policy in the department. We do not need rain or bats in the labs or frozen pipes in the winter. Yes, these have all happened several times in the past. Therefore do not attempt to open the windows.

14. ECE Lab Support Staff

Chuck Sannes – Lab Supervisor – cesannes@mtu.edu – 727 EERC – (906) 487-2134

Mark Sloat – Research Associate – mesloat@mtu.edu – 727 EERC – (906) 487-2134

SAFETY FIRST

Electrical & Computer Engineering Department

GENERAL SAFETY INFORMATION ORIENTATION AND BASIC SAFETY TRAINING

Emergency procedures:

Emergency Phone:

- Dial 911 from any phone on campus or personal cellular phone.
- Red phones by elevators on most floors have a direct line to Public Safety and Police Services.
- You can also use the phones in the elevators if need be.

Fire:

- Evacuate area. Follow exit signs. Use stairways, do not use elevators. Rooms should have an evacuation plan affixed to the door.
- Fire alarms. Treat all fire alarms as the real thing and don't assume it is a drill. Building must be evacuated and you must stay in a group outside the building so people can be accounted for. Everyone should meet outside in front of the EERC building at least 50 feet away from building.
- Report the fire, even if you are unsure that it has already been reported.

Accidents:

- Major – Dial 911 for ambulance or go to emergency at UP Health System located in Hancock
- Minor – Use the UP Health Systems or Aspirus walk-in clinic.
- Incident Report – An **Incident and Injury Report Form** is required for all accidents. **Incident and Injury Report Form** can be found online at (<http://www.mtu.edu/ehs/report/injury-form/>). The incident report form must be filled out, and submitted, within 24 hours of the injury. There are first aid kits in our shop in EERC 727, as well as the main office EERC 121 with band-aids and other minor items. **All accidents need to be reported; not to assign blame, but to correct the safety hazards.** Accidents include: personal injury, fire, flood, chemical spills, and “near misses”.

Lab Safety:

Training courses:

All supported graduate students (GRA's, GTA's, Graders, & Fellowships) are required to complete online training courses. These course modules vary depending on the job responsibilities of each student. Supported graduate students will receive an email from UL Pure Safety notifying him or her of the required module and includes a deadline date. The username and password will be your MTU username and ISO password. All training should be completed in a timely manner.

Lab coordinator:

All of our labs have a sign posted on the door with pertinent safety information, including the name and contact information of the person responsible for that particular lab.

Two-person rule:

Two or more authorized people need to be present at all times if working in any undergraduate lab. No exceptions!

Housekeeping:

Labs must be kept neat and aisle-ways unobstructed. Nothing is to be stored in aisle-ways or hallways so as to prevent egress from the building in an emergency. Nothing heavy is to be stored on top of cabinets.

Clothing:

No Sandals or bare feet in any lab!

No food or drink in any undergrad lab.

Children:

No child under the age of 12 is permitted in any lab. Anyone between the ages of 12 to 16 must be supervised at all times.

Chemicals:**Labeling and storage:**

All Chemicals must be in original containers or in appropriate containers clearly marked with the original container information. No chemicals are to be left overnight on benches. All chemicals marked flammable are to be stored in a fire retardant or flammable safety cabinet. All corrosive chemicals are to be stored in an acid/corrosive safety cabinet.

Safety glasses:

Approved Chemical safety goggles (splash resistant) must be worn when working with splash eye hazards.

SDS – Safety Data Sheet (formerly MSDS):

It is your right to know all information regarding chemicals you may be working with. If you are working with any chemical, read the SDS documentation for pertinent information on PPE, handling, storage, hazards, and disposal of chemicals BEFORE using them.

The ECE Department utilizes a new system called MSDSonline. Access to MSDSonline can be found under the heading “Need to Know” on MTU’s homepage (www.mtu.edu) or utilizing the QR code on lab signage. All EERC spaces, that contain chemicals, will have a dedicated folder under the MTU “E-binder”.

If you need a chemical for your research that is not currently in your lab, please see Mark Sloat or Chuck Sannes in EERC 727 (with approval from your faculty advisor).. This will ensure that our E-binder is up to date and we may be able to acquire that chemical from another department if only a small amount is required. Order the appropriate amount for your research, excess chemical storage is strongly discouraged!

Disposal:

All chemicals must be properly disposed of or transferred before leaving the Department. See the department safety liaison, Mark Sloat, in 727 EERC if you have questions.

Spills:

For minor chemical spills of a non-toxic nature see Chuck Sannes or Mark Sloat in 727 EERC for absorbent material. For major toxic or flammable liquid spills, evacuate the area, activate the fire pull, and call 911. Warn others not to enter the area if they are heading in that direction.

Electrical safety:

Lethal Voltage and Current:

As little as 50 volts AC can kill under the right conditions. Generally anything above 25ma is considered dangerous since it can potentially cause the heart to go into ventricular fibrillation, which can happen in as little time as ¼ second. Currents in the range of 70ma to 300ma are potentially fatal without immediate first aid. With currents through the body of greater than 25ma you may not be able to “let go”. You can use ohms law ($E=IR$) to calculate body resistance. Dry skin has a resistance from 100k to 600k ohms. With wet skin the resistance drops to around 1k ohm. With an open skin cut, the resistance drops between 100 and 500 ohms. Thus, one needs to be extremely careful with higher voltages. **120VAC can Kill!**

Electrical components:

Electrical components can also be a cause of serious injury. A **resistor** that is operated over its power rating can burn causing a fire, or burst causing sparks and flying debris. **Capacitors** can explode causing the end cap to shoot out with enough force to damage one’s eye. This will happen if a polarized or electrolytic capacitor is hooked up in the wrong polarity or connected to a voltage above its rating. Suddenly opening an **inductive circuit** can cause a large voltage spike, usually for a very short period of time, but could cause heart problems if you are directly exposed to it. Make sure you understand electrical components before using them.

Batteries can explode due to escaping hydrogen gas, especially during charging; ensure adequate ventilation. It is also easy to drop a wrench or screwdriver across exposed battery terminals, so use extreme care with tools around batteries. Always keep a cap or protective cover over the positive battery terminal. Always have a neutralizing agent, such as baking soda, available. Always read and understand the manufacturer’s recommendations before charging any type of rechargeable battery.

Electrical cords – don’t daisy chain electrical strips or cords to make a longer extension cord. All extension cords need to be one cord only and used on a temporary basis (8 hours or less).

Tools and equipment:

Always use double insulated tools. If tools are not double insulated, an internal short and improper grounding may cause the tool case to be electrically “hot”.

Use ground fault interrupters around water or wet environments.

Do not attempt to work with higher voltages (440vac and above). Under no circumstances should students work on LIVE high voltage systems (potential greater than 50 volts). Along with the electrical shock hazard, burns and damaging flashes can also be a serious health risk.

Soldering:

Must wear safety glasses and be performed in accordance with your training. Care is to be taken not to burn benches, power cords, or anything else, including your fingers. Prolonged breathing of solder vapors is harmful. If a vent hood isn’t available use carbon activated fume extractor.

Rotating machines:

All rotating machines must have safety guards in place.

No long hair, jewelry, ties, gloves or other loose clothing around rotating machines.

Other electrical equipment:

Always operate equipment in accordance with the operating manuals and observe safety cautions.

Under no circumstances are you to remove protective covers or cases. If the equipment is faulty, do not attempt to fix it yourself - contact Chuck Sannes or Mark Sloat in 727 EERC, (906) 487-2134.

Lasers:

Special training is required before using any laser equipment. Special safety glasses along with other handling procedures need to be followed depending on the class and type of laser. Special training and procedures are to be given by the professor or TA in charge of the particular laser lab and detailed in the lab procedure.

Other safety information:

Wet floors: Use caution, especially in winter, as floors are likely to have wet spots. No running in halls (MTU has had many wet floor related accidents).

Storage: Do not store anything within 18 inches of a sprinkler head. Use a ladder or approved step stool to reach high items. Don't stand on swivel chairs or desks!

Lifting: No heavy lifting - get help (improper lifting is one of the biggest causes of accidents at MTU).

Details on all safety policies are located on MTU's [Environmental Health and Safety \(EHS\)](http://www.mtu.edu/ehs/) website at <http://www.mtu.edu/ehs/>.

Questions can also be addressed by the department safety liaison, Mark Sloat, in 727 EERC.

COMPUTING CONTACTS

User Services – Help Desk – Library, 1st Floor

(906) 487-1111 it-help@mtu.edu

COMPUTING FACILITIES

Faraday Lab – 723 EERC – available when classes are not in session

22 PCs with Windows 10, Linux operating systems

B/W Laser Printer

Other labs in EERC

EERC 421 - 25 seat Windows Lab - Available when not used for classes

EERC 330 - 45 seat Windows Lab - Available when not used for classes

Wireless Lounge

EERC 318 - available 24/7 - has Husky BW printer

Other computer locations across campus: <http://www.it.mtu.edu/computer-labs.php>

General info for Graduate students: <http://www.it.mtu.edu/grad-students.php>

How do I get Computing Access?

Your account and ID card access are automatically enabled/disabled based on whether or not you are enrolled for the current semester.

If you are not enrolled in the current semester and need access, your advisor will need to send a request to it-help@mtu.edu to grant access.

Lab & Building Hours

24 hour access

Your Tech Express card gets you in the door provided you are registered for the term.

Logging on to the Systems

Userid

Your email address without the @mtu.edu

Domain to use is: MTU

ISO Password

This was mailed to you from the university. It is the password you use in Huskymail

Domain to use is: MTU

Changing Your Password

Passwords can be changed from the following web: <http://www.mylogin.mtu.edu>

Email

Accessing your email: gmail.com

Userid@mtu.edu

ISO password

Your email address: userid@mtu.edu

Configuration & Policy Information: <http://emailinfo.mtu.edu>

Wireless Access

Rovernet wireless access available.

- SB Floor partial coverage
- 1st Floor partial coverage

Wireless Access

- 2nd Floor coverage
- 5th Floor partial coverage
- 6th Floor coverage1
- 7th Floor coverage
- 8th Floor coverage

See www.it.mtu.edu/wireless or the IT Help Desk in the Library for assistance, if needed

Remote Access

- IT Customer Service - located in VanPelt Library, 1st floor
- ECE Specific Remote Access Servers
 - o Remote Login Host (ssh):login.ee.mtu.edu
 - o SFTP Host:login.ee.mtu.edu
 - o Windows Terminal Server: remote.mtu.edu

Important Rules

- Your account is for **your** use only
- Do NOT install software on the PCs / Do NOT reformat PC's
- Be considerate of others
- Lab Behavior
- Disk Usage
- Printing
- NO food or drink in the labs

Getting Computer Help

IT Help Desk in the Library - Hours and services are posted on www.it.mtu.edu

- [Self-service IT support](http://support.it.mtu.edu): support.it.mtu.edu
- Instructor for course related questions
- Other students
- Send email to it-help@mtu.edu
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