

MASTER OF SCIENCE IN ENGINEERING (MS-E)
STUDENT HANDBOOK

School of Engineering & Technology



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1. INTRODUCTION

1.1 About CMU

Welcome to Central Michigan University, a nationally ranked institution that fosters the transformative power of advanced learning while embracing a sense of community among our students, faculty, staff, and more than 250,000 alumni around the world.

Established in 1892 and among just five percent of U.S. universities in the highest two Carnegie research classifications, CMU offers approximately 300 academic programs at the undergraduate, master's, specialist, and doctoral levels.

CMU is a university where students, faculty, staff, and alumni learn to pursue excellence, live with compassion, and be leaders.

Fire Up Chips!

1.2 About Engineering & Technology

The School of Engineering & Technology (SET) at CMU fosters a culture of learning, exploration, and service in a range of engineering and technological disciplines. Our faculty are committed to providing programs of professional study that offer you the requisite training and knowledge to become successful in your career or additional studies.

1.3 Points of Contact

For more information about the Master of Science in Engineering program at CMU, please contact:

School of Engineering & Technology

ET Building 100

Central Michigan University

Mount Pleasant, MI 48859

989-774-3033

etdept@cmich.edu

se.cmich.edu/et



Office of Research and Graduate Studies (ORGS)

251 Foust Hall
Central Michigan University
Mt. Pleasant, MI 48859
989-774-3873
cmich.edu/orgs

Admissions Processing

802 Industrial Drive
Mt. Pleasant, MI 48859
989-774-4444
apply@cmich.edu

1.4 Faculty

The MS-E Program is advised by 19 faculty members, with the information listed below:

- » [Dr. Ahmed Abdelgawad](#) - Professor, 989-774-2455, abdel1a@cmich.edu, ET 130A. Research interests: Low Power Embedded Systems, Signal Processing, Wireless Sensor Networks, VLSI & FPGA Design.
- » [Dr. Frank Cheng](#) – Professor, 989-774-7898, cheng1fs@cmich.edu, ET 248. Research interests: Robotics and Automation, Industrial Automation, Applied Electronics, Fluid Power Technology.
- » [Dr. Brian DeJong](#) – Professor, 989-774-1319, dejon1b@cmich.edu, ET 242. Research interests: Robotics - Sound Location, Mobile Robots, Human-Robot Interaction, Teleoperation, Haptics.
- » [Dr. Goksel Demirer](#) – Professor, 989-774-2456, demir1g@cmich.edu, ET 236. Research interests: Anaerobic Environmental Biotechnology, Wastewater Engineering, Waste Valorization, Resource Efficiency, Sustainability, Pollution Prevention, Industrial Ecology.
- » [Dr. Waseem Haider](#) –Professor, 989-774-1125, haide1w@cmich.edu, BS 4110. Research interests: Additive Manufacturing, Titanium Oxide Nanoparticles/Nanotubes, Thin Films, Graphene-Based Nanocomposites, Piezoelectric Materials, Biomaterials, Surface Engineering, Photocatalysis, Electrochemistry.
- » [Dr. Chanseok Jeong](#) – Associate Professor, 989-774-7683, jeong1c@cmich.edu, ET 133. Research Interests: Inverse Problems in Science and Engineering, Computational Mechanics, and Structural Dynamics and Wave Propagation Analysis.
- » [Dr. Ernur Karadogan](#) –Professor, 989-774-4053, karad1e@cmich.edu, ET 107. Research interests: Robotics, Haptics, Dynamic Systems & Control, Simulations in Virtual Environments, Biomechanics, Medical Education, Undergrad. Engineering Education.
- » [Dr. Roderick Lammers](#) – Assistant Profrssor, 989-774-3814, lamme1r@cmich.edu, ET 147. Research interests: Restoration, Erosion, Natural Infrustructure for Flood Management, Watershed, Stormwater, Water Quality, Seidment Transport, and Pollutants.
- » [Dr. Joseph Langenderfer](#) – Professor, 989-774-1911, lange1je@cmich.edu, ET 244. Research interests: Computational Modeling of Muscle and Joint Loads, Stochastic Biomechanics Modeling, In-Vivo, and in-Vitro Experimental Biomechanics.
- » [Dr. Terence Lerch](#) – Professor, 989-774-7478, lerch1t@cmich.edu, ET 240. Research interests: Thermodynamics, Thermal Fluids, Fluid Mechanics, Statics.
- » [Dr. Itzel Marquez](#) – Associate Professor, 989-774-3657, itzel1l@cmich.edu, ET 232. Research interests: Contaminants of Emerging Concern, Wastewater reuse, Indirect and Direct Potable Reuse, Kinetic and transport mathematical modeling, Natural attenuation of contaminants in water.



- » [Dr. Adam Mock](#) – Professor, 989-774-7702, mock1ap@cmich.edu, ET 130C. Research interests: Theoretical and Computational Electromagnetics, Micro and Nano-Scale Photonics, Parallel Computing.
- » [Dr. James Morrison](#) – Professor, 989-774-3790, morri1j@cmich.edu, ET 130F. Research interests: Semiconductor manufacturing & Industry 4.0, Automation for smart production systems, Stochastic modeling & AI for decision making, Task allocation and design for systems of UAVs, Planning for systems of robots, Design for education and the environment.
- » [Dr. Ishraq Shabib](#) – Professor, 989-774-3692, shabi1i@cmich.edu, ET 254. Research interests: Deformation Behavior and Properties of Nanocrystalline Materials, Irradiation Induced Damage of Structural Materials, Atomistic and Multi-Scale Modeling of Crystal Defects.
- » [Dr. Donghyun Shin](#) – Associate Professor, 989-774-2138, shin1d@cmich.edu, ET 234. Research interests: Nanoscale Heat Storage and Transfer, Nanomaterial Design & Manufacturing, Thermal Energy Storage, Concentrated Solar Power.



2. MS-E PROGRAM

2.1 Program Objectives

The mission of the MS-E program at CMU is

- » To prepare engineering students for industry or higher education, and advance the research and scholarly portfolio of the School of Engineering and Technology (SET).
- » To institute advanced learning and teaching through fostering opportunities for CMU constituents to pursue graduate study in the interdisciplinary areas of Engineering.

The program is intended to enhance students' knowledge, research skills, critical thinking abilities, and communication skills. The expected student learning outcomes include advanced knowledge, analyze and solve engineering problems, advanced communication skills, research ethics in engineering, and designing/conducting engineering research experiments.

2.2 Prospective Students

Prospective students should apply through the CMU [Office of Graduate Studies](#) for the Master of Science in Engineering (Engineering, M.S.) program. To apply, visit [Apply Now](#). Applications are sent from the Office of Graduate Studies to the graduate program coordinator and the school director for review. **March 1/Oct 1** is the deadline to submit the application for Fall/Spring, but rolling admission will continue.

2.3 Admission Requirements

To be considered for admission to the MS-E program, students must meet the following criteria:

- » Students must have completed an undergraduate ABET-accredited engineering degree.
- » Undergraduate cumulative GPA ≥ 2.7
- » GRE is not required
- » 563/223/84+ TOEFL & IELTS 6.5+ for international students. [View your options](#) for determining english proficiency at Central Michigan University. If you are not from a country where English is considered a primary language, you must demonstrate English proficiency. You can [view the list of countries](#) where the Test of English as a Foreign Language (TOEFL) exam is waived.
- »

Students who have degrees from a non-ABET accredited school, or have an undergraduate degree in a different discipline, must show an average GPA of 3.3 in the following classes (or equivalent) to be admitted to the MS-E program:

- » Science (13 credit hours)
 - CHM 131, PHY 145QR, PHY 146, PHY 175
- » Math (11 credit hours)
 - MTH 132, MTH 133, MTH 232
- » Engineering (15 credit hours)
 - EGR 251, EGR 253, EGR 255, EGR 356, and EGR 358; or EGR 190QR, EGR 290, EGR 298, EGR 391, and EGR 396

If needed, you may be required to pass an entrance exam to show competency in the above subjects.

Additional Information



- » Students who have an undergraduate engineering technology degree/background and wish to apply to the MS-E program must have completed Calculus III with a grade of C- or better.
- » Students already having a Master's degree in engineering or a related field from any institution have the same admission criteria as other applicants.
- » Students having a Ph.D. in Science of Advanced Materials (SAM) will not be considered for enrollment in the MS-E program.

2.4 Student Admissions

Step One:

- » [Apply Online](#) as a prospective student pursuing a graduate degree.
- » Pay the \$50 (domestic) or \$65 (international) application fee online.

Step Two:

Applicants must provide official copies of **transcripts/individual mark sheets/diplomas** mailed in a sealed envelope for the school(s) you attended or have the schools send them directly to CMU at the address below. Transcripts can be sent electronically to apply@cmich.edu (for domestic) or isr@cmich.edu (for international). Documents are required in the native language and a certified English translation is required. Copies uploaded to your application will not be accepted.

Mailing Address (transcripts, exam results, etc.):

| Domestic Students | International Students |
|--|--|
| Central Michigan University Transcript Department 802 Industrial Drive Mount Pleasant, MI 48858 | Central Michigan University Attn: International Applications Processing 802 Industrial Drive, Global North Mount Pleasant, MI 48858 USA |

Step Three:

Include all of the following required documents with your application:

- » TOEFL & IELTS scores (for International Students Only)
- » Three (3) Letters of recommendation
- » Statement of Purpose

Step Four:

Once your application is complete it will be evaluated for acceptance. The most common mistake students make is submitting an incomplete application. Please be sure to verify your application is complete. You may do this by using the [Track My App](#) function in your online application or by emailing apply@cmich.edu or <mailto:isr@cmich.edu>. You will receive your admissions status notification electronically to the email you used in your online application.

Step Five:

- » Once you are admitted to the graduate program, the International Student and Scholar Services (ISSS) will contact you directly regarding immigration documents.
- » You will submit your financial documents (bank statements), financial support form (provided by ISSS), copy of passport or any other documents needed to the ISSS. Note: scanned and emailed copies are acceptable. If the students are receiving funding, then they are not required to do this. Their funding offer letter will serve the purpose.



- » Once all required documents are received, the ISSS will email you requesting payment to ship your welcome packet.

Step Six:

The OGE ISSS will mail your welcome packet once you have made the shipping payment. The packet will include admissions letter, I-20/DS-2019, and arrival information.

Admissions questions? Please contact: 989-774-4723 or isr@cmich.edu
Immigration/I-20/DS-2019 or visa questions? Please contact: 989-774-4308 or i20@cmich.edu

Step Seven:

- » Report your arrival to SET main office located at ET 100.
- » Report to Faculty Personnel Services located at 308 Warriner Hall.
- » Obtain your Central ID card from 209 Bovee University Center
- » Apply for social security number (SSN) at 1940 Sweeney St, Mt Pleasant, MI 48858

2.5 English Proficiency

- **TOEFL:** 550 PBT/79 IBT for regular admission. School Code 1106
- **IELTS:** 6.5 for regular admission.
- **Pearson Test of English (PTE):** 53 for regular admission.
- **Duolingo:** 100 for regular admissions.
- **Michigan English Test (MET):** A score of 52 is required for regular admission.
- **International Baccalaureate (IB):** A grade of 5 in English at the Higher Level is required for regular admission.
- **Advanced Placement (AP):** A score of 4 on the English Language or English Literature Exams.
- **General Certificate of Secondary Education (GCSE) or General Certificate of Education (GSE):** A score of A or B on the English Language Exam.
- **SAT:** Evidence-based Reading and Writing (EBRW) score of 520.
- **ACT:** English score of 21.
- **ELS Language Center Program:** Completion of Level 112 for regular admission.

Please note: You may be exempt from submitting an English Proficiency Test if you are from an [english-speaking country](#).



3. DEGREE REQUIREMENTS

Within the MS-E Program at CMU, students have the option to pursue one of the two tracks for obtaining their degree. There is the *Thesis Plan* or the *Course Based Plan*. Specific requirements for each of these options can be found below.



3.1 Academic Advising

MS in Engineering students is required to meet with their engineering advisor each semester to ensure students select appropriate courses to facilitate their progress through the program. Registration is not allowed until after this meeting. Prerequisites are strictly enforced for all engineering classes.

3.2 Thesis Plan (Plan A)

30 credit hours are required, which includes 24 hours of course work, 6 hours of thesis, and a successfully defended MS thesis.

By the end of the first semester, students will have to choose their thesis advisor and work with them to develop a plan addressing how the MS degree requirements will be met. The plan should be submitted to the graduate coordinator for review by the end of the first semester.

Required Courses (21 hours)

| | | |
|-------------------------|--------------------------------------|-----------|
| EGR 600 | Advanced Engineering Analysis | 3(3-0) |
| EGR 601 | Advanced Engineering Experimentation | 3(2-2) |
| EGR 637 | Directed Research in Engineering | 1-6(Spec) |
| EGR 685 | Research in Engineering | 1-3(Spec) |
| EGR 798 | Thesis Research | 1-6(Spec) |

Notes:

- [EGR 637](#) must be taken at least two (2) times.
- [EGR 685](#) must be taken three (3) times.



- [EGR 798](#) needs to be taken two (2) times.

Electives (9 hours)

Select graduate level EGR and EGT courses approved by the advisor and school director. Students can take up to 6 credits from other departments and colleges approved by the advisor and school director.

3.2.1 Thesis Committee

Students should consult their advisor in selecting a committee chairperson and at least two additional committee members. All members of the committee must have graduate faculty status as defined by the Academic Senate's Graduate Education Policy.

- a. The committee chair must be an assistant, associate, or full CMU professor on regular, medical, or research faculty appointment with full graduate faculty status. The committee chairperson may or may not be the advisor, depending upon the student's academic emphasis. The chairperson of the thesis/doctoral project/dissertation/journal article/book committee will have active direction of the work but may consult with other members of the committee about matters pertinent to its development. The committee as a whole, however, will determine the quality of the work.
- b. At least one other member of the committee must be either a CMU tenured-tenure-track faculty member or a CMU fixed-term faculty member (not to be confused with an adjunct faculty member). This committee member may or may not be in the student's program or department, and they must hold either full or associate graduate faculty status.
- c. The third committee member may also be from CMU as described above, or they may be from outside of CMU with associate graduate faculty status. The third member may be a post-doctoral scholar with associate graduate faculty status, provided their post-doctoral advisor is not also a member of the committee.
- d. Any additional committee members may also be from CMU as described above, or they may be from outside of CMU with associate graduate faculty status. The additional member may be a post-doctoral scholar with associate graduate faculty status, provided their post-doctoral advisor is not also a member of the committee. (Academic Senate 3/25/25)

The candidate will receive a grade (credit or no credit) in EGR 798 only after satisfactory completion of the entire six hours and after the acceptance of the thesis by the committee. A "Z" grade will be recorded in EGR 798 until the final grade is assigned.



3.3 Course based Plan (Plan B)

Required Courses (9 hours)

| | | |
|-------------------------|--------------------------------------|-----------|
| EGR 600 | Advanced Engineering Analysis | 3(3-0) |
| EGR 601 | Advanced Engineering Experimentation | 3(2-2) |
| EGR 685 | Research in Engineering | 1-3(Spec) |

Note: [EGR 685](#) must be taken three (3) times.

Electives (21 hours)

Select graduate level EGR and EGT courses approved by the advisor and school director. Students can take up to 6 hours from other departments and colleges approved by the MS-EGR program coordinator and school director.

3.4 Accelerated MS in Engineering

Up to 9 credit hours may be double-counted from appropriate courses in undergraduate degree for an accelerated MS in Engineering Program at CMU. Contact the [Office of Research and Graduate Studies](#) for more information regarding admission for accelerated programs.

The Accelerated Master's Degree Programs (AMDP) is intended for a) CMU undergraduate students who possess a strong academic background; b) are maintaining a "B" average in their undergraduate coursework; c) are generally going into their senior year; d) plan to complete their graduate degree at CMU. The program allows specific graduate-level courses that, upon successful completion and graduation, will apply to the student's graduate record at CMU.

3.5 General CMU and SET Policies

- i. 'Time for completion of degree' policies, 2025-2026 Graduate Bulletin » Admission » Duration of Admission Status: Time for Completion of Degree and link to 'Extension of time' forms, <https://www.cmich.edu/offices-departments/office-research-graduate-studies/graduate-studies/student-services/forms>
- ii. CMU policy on Incomplete and Deferred Grades, 2025-2026 Graduate Bulletin » Policies and General Information » Academic Policies and Information » Grade, Incomplete and Deferred
- iii. Academic Probation and Dematriculation as part of Academic and Retention Standards, 2025-2026 Graduate Bulletin » Policies and General Information » Academic Policies and Information » Graduate Academic and Retention Standards
- iv. Students become inactive after 3 yrs of no enrollment (they need to re-apply to the program to enroll in courses) 2025-2026 Graduate Bulletin » Admission » Period of Inactivity



- v. Course repeat policy: can repeat 2 times; grade from final attempt is used in GPA: 2025-2026 Graduate Bulletin » Policies and General Information » Academic Policies and Information » Graduate Repeat Course Policy
- vi. Continuous enrollment is no longer required for all students by CMU (your program may have a reason to require it). Be aware students lose access to email, etc.. when not enrolled, and see #vii. If you plan to skip one semester, registering for the following semester may prevent losing access to basic functions.
- vii. Extended Access Requests, <https://www.cmich.edu/offices-departments/office-research-graduate-studies/graduate-studies/student-services/forms>
- viii. To remain in the MS-E program, a student must meet the following criteria:
 - Students must select courses in consultation with an engineering advisor.
 - Students may not take courses required for this degree Credit/No Credit (except EGR 798).
 - At least 24 credits must be taken at CMU to graduate with this degree.
 - If a student does not continue to meet the retention standards, s/he may be asked to withdraw. The school maintains the right to terminate a student if s/he is not progressing satisfactorily.
 - Students who do not meet degree requirements by the end of the 4th year will be terminated.

3.6 Transfer credits

The MS-E committee will consider transferring graduate credits from other institutions. If considered, the transfer must be decided upon before admission and stated in the offer letter.



4. GRADUATION

4.1 Deadlines

Students should submit a graduation application by the semester before their anticipated graduation date. Graduation Applications must be submitted via *Degree Progress* on CentralLink. Degrees are conferred seven times each year and students should visit the Office of Research and Graduate Studies website for updated deadline information.

**Students must apply for graduation, even if they will not participate in commencement ceremonies. Applying for graduation generates an audit of the student's academic file and notifies the university that the student intends to graduate.*

Note to Graduate Degree Applicants

At the time of filing the graduation application, it is the responsibility of the student to determine whether his/her advisor will be available to approve the thesis or any other papers necessary for graduation. For updated deadline information, visit this [link](#).

4.2 I-20 Extension

International students that do not graduate in two years (finishing up thesis) must contact the Office of Global Engagement at 989-774-4308 or izo@cmich.edu to get their I-20's extended.

4.3 Required Submissions

4.3.1 Prospectus and getting started in research

- i. Guidelines to beginning research and the Prospectus: <https://www.cmich.edu/offices-departments/office-research-graduate-studies/graduate-studies/student-services/forms>
- ii. Committee composition & formation: The committee composition and formation procedure has been outlined in Section 3.2.1
- iii. Timing of Prospectus submission: 2025-2026 Graduate Bulletin » Registration » Internships, Practica, Independent Studies, Theses, Doctoral Projects, Dissertations
 - a. Prospectus is typically submitted in year 1 or 2 in most programs. A more detailed program-specific prospectus could be completed at a later time.
 - b. '...students may NOT enroll for more than 3 thesis credits or 6 doctoral project/dissertation credits until the Prospectus and committee composition have been approved.
 - c. Before submission, project must have IRB, IACUC, or IBC approvals if appropriate.
- iv. Prospectus Approval: 2025-2026 Graduate Bulletin » Degree Candidacy and Requirements for Graduation
 - a. Required: Title; Technical Synopsis; Layperson Summary (one paragraph maximum). Details on requirements of technical synopsis: https://www.cmich.edu/docs/default-source/academic-affairs-division/research-and-graduate-studies/graduate-studies/2024-2025prospectusguidelines.pdf?sfvrsn=26c75282_7



- b. Prospectus Form to submit through DocuSign:
<https://powerforms.docusign.net/36a760d2-10b6-4fdd-bbda-252d3d415682?env=na4&acct=de338806-af74-4d3f-a622-852eee5f8f30&ActivateOnly=1&accountId=de338806-af74-4d3f-a622-852eee5f8f30>

Timely submission of prospectus is important! 'Projects undertaken prior to final approval of prospectus may be denied, the project deemed invalid, and the student will have to begin the process anew.'

4.3.2 Thesis/Dissertation requirements

- a. Ensure your description of 'journal article' format requirements match the Guidelines: https://www.cmich.edu/docs/default-source/academic-affairs-division/research-and-graduate-studies/graduate-studies/guidelinesd53989b8-59ba-4034-8be0-09b43f79c952.pdf?sfvrsn=165f58a2_24
- b. Committee chairs need to review each thesis/dissertation using iThenticate to check for plagiarism and to check for copyright permissions. Details are in the above link.
- c. Form to submit through DocuSign: <https://powerforms.docusign.net/cc89ffd1-794e-4f48-8271-733e072e277c?env=na4&acct=de338806-af74-4d3f-a622-852eee5f8f30&ActivateOnly=1&accountId=de338806-af74-4d3f-a622-852eee5f8f30>

For theses/dissertations/journal article(s) to meet the Office of Research and Graduate Studies submission deadline, the following document must electronically accompany the student's final document:

[Updated Thesis/Dissertation/Journal Article Information](#) including templates, can be found on the [Resources for Graduate Students website](#)



5. FINANCIAL SUPPORT

5.1 Graduate Teaching Assistants (TAs)

TA selection will also follow the same process as the student selection, outlined in section 2.3. However, a maximum of **one TA** will be assigned to a research advisor at a given time. TA support will be given for a 9-month period during each academic year. The workload is twenty hours per week for a full-time Graduate Teaching Assistant. Tuition remission of up to a total of twenty (20) hours of graduate study per academic year (Fall, Spring, and Summer terms).

Full-time enrollment with no financial support is 9 credit hours per semester. Full-time enrollment with financial support is 6 credit hours per semester.

Any summer support will be on a case-by-case basis and will be determined by the advisor, school director, and the student.

5.2 Graduate Research Assistants (RAs)

Graduate Research Assistants are assigned to faculty to conduct research projects to the faculty's expertise. The workload is twenty hours per week for a full-time Graduate Research Assistant. Tuition remission of up to twenty (20) hours of graduate study per academic year (Fall, Spring, and Summer terms).

Research Assistant positions will be handled on a separate case-by-case basis by faculty recommendation and are subject to funding & grant availability.

5.3 Graduate Student Grants

The school, college, and Office of Research and Graduate Studies (ORGS) provides several [grants](#) to support research and travel to attend conferences.

- » [ORGS](#) GA Conference Grant. \$200.
 - Must apply before the conference. For TAs only
- » [ORGS](#) Student Performance, Exhibition, Competition, or Presentation (PECP) Grant: \$500.
 - Matching fund needed
- » [ORGS](#) Student Endeavors Grant: \$800
- » ORGS Graduate Student Publication Grant: \$750
- » CSE Student Organization Grants (Please note this is per organization and not per student):
 - Mini Grant: \$100
 - Conference Grant: \$750
- » SET conference travel/supply grant: twice during the program. The amount depends on the availability of the funds.



5.4 Other Hourly Employment

Working on campus is another way to earn funds to support your studies at CMU. International students who are not receiving any form of financial support are permitted to work on campus for up to 20 hours per week during the fall and spring semesters, and 40 hours per week during the breaks.

Domestic Student employees may work a maximum of 40 hours per week during the Summer Semester. (Effective Aug. 25, 2019).

Specific information for International Student On-Campus employment can be found on the [International Student and Scholar Services | Central Michigan University \(cmich.edu\)](#).

Available on-campus job opportunities can be found on the Student Employment Services Website at [Student Employment Services | Central Michigan University \(cmich.edu\)](#).

5.5 Tuition Waiver

Students should complete their tuition waiver form as soon as possible once they have registered for courses and the courses show up on the CMU billing to avoid late payment fees.

Students apply for the tuition waiver online-thru Central link. However, make sure that your application states "Graduate Students", as there is a difference between the application for Graduate Students and Faculty/Staff.



6. FREQUENTLY ASKED QUESTIONS

- » *Where can I find the graduate bulletin?*

The Graduate [bulletin](#) can be found on the CMU website under “My Account” on CentralLink

- » *I am an international student and have not applied to CMU and I have questions, whom should I contact?*

Graduate International Admissions at 989-774-1619 or isr@cmich.edu

- » *I have already applied to CMU and I have questions, whom should I contact?*

Admissions at 989-774-3076 or apply@cmich.edu

- » *Where can I find the forms I need?*

All [forms](#) can be found on the [Office of Research and](#) Graduate Studies website or in the appendix of this document.

- » *Can I take a tour of campus virtually?*

Yes! Visit [Explore & Visit Central Michigan University | Central Michigan University \(cmich.edu\)](#) to view our campus and explore your Life at Central.

- » *How can I pay my application fee?*

Your application fee can be paid online via credit card, check or money order.

- » *What calendar does CMU follow? For more information, [visit our academic calendar](#).*

- » Fall semester (August-December)
- » Spring semester (January-May)
- » First Summer semester (May-June, optional six-week session)
- » Second Summer semester (June-August, optional six-week session)



7. IMPORTANT FORMS & DOCUMENTS

Many of the necessary forms can be found [here](#) on the ORGS website at grad.cmich.edu

7.1 FOR FACULTY & STAFF

Student, Advisor, & Front Office Responsibilities

| STUDENT | ADVISOR | ET OFFICE |
|--|---|--|
| Take care of all holds on account. Be in contact with the advisor on course selection and complete the Program Plan. And submit advising form and EGR 637 form (if applicable- COMPLETED) | Have communication with the student after agreeing to be their advisor that will help them determine what their 3rd class should be and complete the program plan. If the 3rd course is EGR 637, the advisor will make sure that the form is COMPLETED and it is turned in for registration. | Send email welcoming them to CMU, advising them of any holds on their account, asking them to have their advisor let them know what courses should be taken. First-semester students typically should take EGR 601 (Fall) or EGR 600 (Spring), EGR 685 (1 credit), and 3 credits of EGR 637 or a 3 credit course that will assist them in their research. (Advisor is copied in on the email.) This email instructs students to complete their tuition waiver form once registration has been completed. |
| Complete tuition waiver (on Central Link) | | Enter Program Plan into Degree Progress |

7.2 MSE Grad Advising Guidelines:

- » Program Plan should be signed before the end of the first semester.
- » The prospectus should be signed before the end of the second semester.
 - Graduate Students are the **first students allowed to register**. They should **not wait until just before classes start to register** unless they just got here.
- » The student must be registered for a minimum of 6 credit hours for Fall and Spring semesters to retain their GA status.
- » All forms should be turned into the Front Office.



8. EXAMPLE FORMS

CMU

CENTRAL MICHIGAN
UNIVERSITY

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ENGINEERING & TECHNOLOGY INDEPENDENT STUDY FORM

****PLEASE PRINT LEGIBLY****

22365348 CRN IET ☐ EGR ☒ 637 3 Credit Hours
Fall ☐ Spring ☒ Summer I ☐ Summer II ☐ 2019 Year 22365348 Campus ID Number

Student Name _____ E-Mail Address @cmich.edu Telephone _____
Local Address _____

Application of ML at Edge Devices
Proposed Title

The attached proposal should summarize the following:

1. Statement of the problem or area to be studied
2. Statement of the sub-problems and limits of the study
3. Rationale for the study
4. Tentative procedure to be used in the study
5. Sources of information and resources
6. Conclusion outcomes of the study (evaluation instrument, plans for publication, teaching aids developed, prototype, etc.)
7. Statement of criteria for (a) successful completion; and, (b) quality of the study, to be determined with the project advisor

05/10/19 Completion Date 1) _____ 2) _____ 3) _____
Conference Dates with Project Advisor

Culminating activity will be: ☒ Written Report ☐ Written Exam ☐ Prototype ☐ Other _____

ACCEPTED:

Student Signature _____ Printed Name _____ Date 04/24/19

Academic Advisor Signature _____ Printed Name _____ Date _____

Project Advisor Signature _____ Printed Name _____ Date _____

Copies to: Student
Academic Advisor
Project Advisor

COPY



Internet of Things is a wireless network where sensors and actuators are connected by some wireless communication link to a central server. The “Thing” in IoT can be anything from toasters, thermostats, smart energy efficient houses, wearable electronics, and assistive technologies for the disabled and the elderly, medical & healthcare equipment, automotive applications such as V2V communication, SHM, environmental monitoring, agriculture, industrial automation, access control systems and so on. In a broad sense the “Thing” can be any physical object connected to a wide network to collect and exchange data. Everything around us is collecting data, analyzing it in some way and acting upon the reached conclusion based on those data. IoT enabled devices help us make better, more accurate data which interpreted appropriately, cuts down on waste and improves efficiency. This opens up a lot of possibilities for improving how we consume and utilize resources.

Machine learning is a new paradigm in computing and is rapidly making its way in to IoT. It gives computers a new way to carry out complicated tasks without being explicitly programmed by humans. Machine learning is helping us make more accurate decisions based on streaming data collected by IoT devices. As IoT enabled devices gather more data, machine learning algorithms take advantage of the abundance of real life data to make more accurate models to deal with problems. Models in machine learning are developed based on examples and experience. As IoT devices and wireless sensor platform constantly acquire information about the environment, the volume of data is inevitably very large. Transmitting such amount of data wirelessly consumes enormous amount of energy and in some cases the sensor platforms are in such remote places that network strength is not powerful or reliable enough to provide such facilities.

Our goal is to use machine learning techniques to analyze the acquired data before the data is sent out so that some preliminary analysis is already done on the edge devices and the size of the data to be transmitted is somewhat reduced. The current literature is evidence enough to support that employing machine learning to diverse applications has improved the performance by a significant margin but ML algorithms requires vast computation resources which most edge node devices lack. Therefore, our challenge is to implement such ML technique so that the amount of data to be transmitted is curtailed and the algorithm can run on resource-constraint hardware without affecting the primary purpose of the node. The use of machine learning is as ubiquitous as the applications of IoT and together these technologies have the potential to vastly improve our lives, reduce waste and maintain proper utilization of resources.

Deliverables:

Conference/Journal Paper describing the findings.

COPY



9. EXAMPLE DEGREE MAPS

9.1 Research Track

| Degree Map | | | |
|---------------------------------|---------------------|---------------------------|------------------------|
| BULLETIN YEAR: 2020-2021 | Degree: M.S. | Major: ENGINEERING | Track: RESEARCH |

The major map illustrates one path to completing your major, based on faculty members' advice on course sequence and a school tentative plans for scheduling courses. This document provides general direction. For more specific advice and up to date schedules, it is expected that students will regularly discuss their plans of study with academic advisors and monitor the current class schedules as students are responsible for ensuring that all requirements for graduation have been met.

| Course | Cr. Hrs. | | Course | Cr. Hrs. | |
|---|---------------------|----|---|---------------------|---|
| FIRST YEAR | | | | | |
| Semester: Fall | Total Credit Hours: | 7 | Semester: Spring | Total Credit Hours: | 7 |
| EGR 601: Advanced Engineering Experimentation | 3 | | EGR 600: Advanced Engineering Analysis | 3 | |
| EGR 685: Seminar Current Topics in Engineering Research | 1 | | EGR 685: Seminar Current Topics in Engineering Research | 1 | |
| EGR 637: Directed Research in Engineering | 3 | | EGR 637: Directed Research in Engineering | 3 | |
| | | | | | |
| | | | | | |
| Course | Cr. Hrs. | | Course | Cr. Hrs. | |
| SECOND YEAR | | | | | |
| Semester: Fall | Total Credit Hours: | 10 | Semester: Spring | Total Credit Hours: | 6 |
| EGR 685: Seminar Current Topics in Engineering Research | 1 | | EGR 791: Directed Research in Engineering | 3 | |
| EGR 637: Directed Research in Engineering | 3 | | EGR 798: Thesis Research | 3 | |
| EGR 791: Independent Research in Engineering | 3 | | | | |
| EGR 798: Thesis Research | 3 | | | | |
| | | | | | |
| | | | | | |

30 hours minimum required for graduation

15 hours 600 level or above required

Notes Here



9.2 Course based – Photonics

| Degree Map | | | |
|---------------------------------|---------------------|---------------------------|-------------------------|
| BULLETIN YEAR: 2020-2021 | Degree: M.S. | Major: ENGINEERING | Track: Photonics |

The major map illustrates one path to completing your major, based on faculty members' advice on course sequence and a school tentative plans for scheduling courses. This document provides general direction. For more specific advice and up to date schedules, it is expected that students will regularly discuss their plans of study with academic advisors and monitor the current class schedules as students are responsible for ensuring that all requirements for graduation have been met.

| Course | Cr. Hrs. | Course | Cr. Hrs. |
|---|-------------|---|-------------|
| FIRST YEAR | | | |
| Semester: Fall Total Credit Hours: | 10 | Semester: Spring Total Credit Hours: | 10 |
| EGR 601: Advanced Engineering Experimentation | 3 | EGR 600: Advanced Engineering Analysis | 3 |
| EGR 685: Seminar Current Topics in Engineering Research | 1 | EGR 685: Seminar Current Topics in Engineering Research | 1 |
| EGR 588: Photonics | 3 | EGR 597M: Mechanics of Composite Materials | 3 |
| MTH 534: Applied Mathematics and Differential Equations | 3 | PHY 554: Optics | 3 |
| | | | |
| Course | Cr. Hrs. | Course | Cr. Hrs. |
| SECOND YEAR | | | |
| Semester: Fall Total Credit Hours: | 10 | Semester: Spring Total Credit Hours: | |
| EGR 685: Seminar Current Topics in Engineering Research | 1 | | |
| EGR 597K: Metamaterials Antenna Theory | 3 | | |
| PHY 634: Advanced Electricity and Magnetism | 3 | | |
| EGR 791: Independent Research in Engineering | 3 | | |
| | | | |
| | | | |

30 hours minimum required for graduation

15 hours 600 level or above required

Notes Here



9.3 Course based – Internet of Things (IoT) Track

Degree Map

BULLETIN YEAR: 2020-2021 **Degree:** M.S. **Major:** ENGINEERING **Track:** IoT

The major map illustrates one path to completing your major, based on faculty members' advice on course sequence and a school tentative plans for scheduling courses. This document provides general direction. For more specific advice and up to date schedules, it is expected that students will regularly discuss their plans of study with academic advisors and monitor the current class schedules as students are responsible for ensuring that all requirements for graduation have been met.

| Course | Cr. Hrs. | | Course | Cr. Hrs. |
|---|-------------|--|---|-------------|
| FIRST YEAR | | | | |
| Semester: Fall Total Credit Hours: | 10 | | Semester: Spring Total Credit Hours: | 10 |
| EGR 601: Advanced Engineering Experimentation | 3 | | EGR 600: Advanced Engineering Analysis | 3 |
| EGR 685: Seminar Current Topics in Engineering Research | 1 | | EGR 685: Seminar Current Topics in Engineering Research | 1 |
| EGR 580: Fundamentals of Internet of Things | 3 | | EGR 697: Special Topics in Engineering | 3 |
| CPS 510: Software Systems Engineering | 3 | | CPS 585: Applied Data Engineering | 3 |
| | | | | |
| Course | Cr. Hrs. | | Course | Cr. Hrs. |
| SECOND YEAR | | | | |
| Semester: Fall Total Credit Hours: | 10 | | Semester: Spring Total Credit Hours: | |
| EGR 685: Seminar Current Topics in Engineering Research | 1 | | | |
| EGR 585: Wireless Sensor Networks | 3 | | | |
| EGR 597A: Hardware-Assisted Security | 3 | | | |
| EGR 791: Independent Research in Engineering | 3 | | | |
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30 hours minimum required for graduation

15 hours 600 level or above required

Notes Here



9.4 Course based – Electrical and Computer Engineering (ECE)

| Degree Map | | | |
|---------------------------------|---------------------|---------------------------|-------------------|
| BULLETIN YEAR: 2020-2021 | Degree: M.S. | Major: ENGINEERING | Track: ECE |

The major map illustrates one path to completing your major, based on faculty members' advice on course sequence and a school tentative plans for scheduling courses. This document provides general direction. For more specific advice and up to date schedules, it is expected that students will regularly discuss their plans of study with academic advisors and monitor the current class schedules as students are responsible for ensuring that all requirements for graduation have been met.

| Course | Cr. Hrs. | | Course | Cr. Hrs. | |
|---|---------------------|----|---|---------------------|----|
| FIRST YEAR | | | | | |
| Semester: Fall | Total Credit Hours: | 10 | Semester: Spring | Total Credit Hours: | 10 |
| EGR 601: Advanced Engineering Experimentation | 3 | | EGR 600: Advanced Engineering Analysis | 3 | |
| EGR 685: Seminar Current Topics in Engineering Research | 1 | | EGR 685: Seminar Current Topics in Engineering Research | 1 | |
| EGR 580: Fundamentals of Internet of Things | 3 | | EGR 591: CMOS Circuit Design | 3 | |
| EGR 588: Photonics | 3 | | EGR 697: Special Topics in Engineering | 3 | |
| | | | | | |
| Course | Cr. Hrs. | | Course | Cr. Hrs. | |
| SECOND YEAR | | | | | |
| Semester: Fall | Total Credit Hours: | 10 | Semester: Spring | Total Credit Hours: | |
| EGR 685: Seminar Current Topics in Engineering Research | 1 | | | | |
| EGR 585: Wireless Sensor Networks | 3 | | | | |
| EGR 597K: Metamaterials Antenna Theory | 3 | | | | |
| EGR 791: Independent Research in Engineering | 3 | | | | |
| | | | | | |
| | | | | | |

30 hours minimum required for graduation

15 hours 600 level or above required

Notes Here



9.5 Course based – Mechanical Engineering (ME)

Degree Map

BULLETIN YEAR: 2020-2021 Degree: M.S. Major: ENGINEERING Track: ME

The major map illustrates one path to completing your major, based on faculty members' advice on course sequence and a school tentative plans for scheduling courses. This document provides general direction. For more specific advice and up to date schedules, it is expected that students will regularly discuss their plans of study with academic advisors and monitor the current class schedules as students are responsible for ensuring that all requirements for graduation have been met.

| Course | Cr. Hrs. | Course | Cr. Hrs. |
|---|----------|---|----------|
| FIRST YEAR | | | |
| Semester: Fall Total Credit Hours: | 10 | Semester: Spring Total Credit Hours: | 10 |
| EGR 601: Advanced Engineering Experimentation | 3 | EGR 600: Advanced Engineering Analysis | 3 |
| EGR 685: Seminar Current Topics in Engineering Research | 1 | EGR 685: Seminar Current Topics in Engineering Research | 1 |
| EGR 553: Mechanical Vibrations | 3 | EGR 554: Mechanical Controls | 3 |
| EGR 576: Mechanics of Composite Materials | 3 | EGR 697: Special Topics in Engineering | 3 |
| | | | |
| Course | Cr. Hrs. | Course | Cr. Hrs. |
| SECOND YEAR | | | |
| Semester: Fall Total Credit Hours: | 10 | Semester: Spring Total Credit Hours: | |
| EGR 685: Seminar Current Topics in Engineering Research | 1 | | |
| EGR 578: Advanced Mechanics of Materials | 3 | | |
| Elective | 3 | | |
| EGR 791: Independent Research in Engineering | 3 | | |
| | | | |
| | | | |

30 hours minimum required for graduation

15 hours 600 level or above required

Notes Here

