JOHNS HOPKINS
WHITING SCHOOL
of ENGINEERING

Two-Course Thesis Option

Master of Science in Mechanical Engineering

JHU Engineering for Professionals

Overview

This document outlines the process for completing a two-semester thesis in the Mechanical Engineering program at Johns Hopkins University Engineering for Professionals (JHU EP). The thesis process has two required courses:

535.820 Master's Graduate Research

This course provides masters students in mechanical engineering the opportunity to conduct original research for a thesis under the guidance of a faculty advisor. Students will identify a research topic, review relevant literature, develop research questions and/or hypotheses, design a study methodology, collect and analyze data, and interpret findings. The culmination of the course is a scholarly project report suitable for publication that demonstrates the student's mastery of mechanical engineering research methods and their ability to advance knowledge in the field. The research must be conducted at the level of at least a master's degree, as determined by the student's research advisor, which can be an academic advisor, a current full-time faculty member at the Department of Mechanical Engineering at Johns Hopkins University, a research staff member at the Johns Hopkins University Applied Physics Laboratory, or an active instructor affiliated with one of the Engineering for Professionals programs. Prior written approval of the advisor and the program chair must be received before enrolling in this course.

535.821 Master's Graduate Thesis

This course provides guidance and support for mechanical engineering masters students writing their final thesis. Students will review relevant literature, refine their research questions/hypotheses, analyze data, draw conclusions based on their research, and work with feedback from peers and faculty advisors to improve their writing. The primary focus of the course is the production of the master's thesis, including ensuring necessary components like an introduction, literature review, methodology, results, and discussion sections are present. Students will develop scholarly writing and editing skills so that their thesis is publication-ready by the end of the course, demonstrating their ability to conduct and clearly convey independent research in mechanical engineering. Students interested in this course must have prior approval from their advisor and the Program Chair to follow the Thesis track. Upon approval by the committee, the final electronic thesis is submitted to the library. Note: If the final electronic thesis has not been submitted to the MSE library (https://www.library.jhu.edu/library-services/electronic-theses-dissertations/) by the end of the second semester, the research advisor may assign an "I" [incomplete] grade until all conditions are met.

Thesis Proposal Process

Students and research advisors should familiarize themselves with the Mechanical Engineering program requirements for the thesis option, ensuring that all prerequisites are met, then follow the steps below:

1. The student should contact a potential research/thesis advisor from the Mechanical Engineering department or an instructor within the Engineering for Professionals Mechanical Engineering

Program. The student may approach the advisor with a clear project in mind or with a broad research area of interest with the intention of soliciting suggestions from the advisor to define the topic.

2. After agreeing on a topic with the thesis advisor, the advisor may propose the other members of the thesis committee, consisting of the research/thesis advisor, a second reader, and an optional third reader to provide independent opinions on the research and associated documentation. One of the additional readers must be a faculty affiliated with the WSE Mechanical Engineering Department or an instructor within the Engineering for Professional Mechanical Engineering Program. The other readers may be any member of the technical community (JHU or elsewhere). Readers are subject to approval by the Mechanical Engineering Program Chair.

3. The student must draft a proposal of approximately two-to-three pages, outlining the scope of the research, key objectives, and the potential impact of the work. The proposal approval form must identify the research advisor and other members of the thesis committee.

4. The thesis committee must approve the proposal by signing the proposal form, which will then be forwarded to the Program Chair via ep-meche-thesis@jh.edu for final approval. Once approved, the Chair will submit the form to the registrar to request enrollment in the appropriate section. The proposal form needs to be completed for each course (535.820 and 535.821) for enrollment to be processed, with the proposal form for 535.821 focusing on providing a status update on the thesis.

5. During enrollment in 535.820 Master's Graduate Research, the student will implement the research plan identified in the proposal, with the expectation of regular meetings with the research advisor, with the frequency agreed upon between the student and advisor.

6. At the end of 535.820, the student shall schedule a status update presentation at a time and location of convenience to the student and the thesis committee (online meeting is acceptable). If there are unique challenges or problems, these should be mentioned as part of the status update presentation. The status update presentation should provide a clear indication of what needs to be done to ensure completion of the project by the end of the second semester. The research advisor will assign a grade for the first course, 535.820, based on a scholarly project report and status update presentation. A separate grade will be assigned for the second course, 535.821.

7. Upon successful completion of the first course, the student must complete a new thesis project approval form that provides a status update, and obtain the necessary signatures to enroll in the second course, 535.821, allowing them to continue their research and begin writing the final thesis.

Thesis Submission Process

1. A final defense and corresponding deliverable are to be completed by the end of the second semester (535.821). The student must schedule a thesis defense presentation with the research advisor and thesis committee (online meeting is acceptable). The academic advisor should also be informed about the defense. Upon approval by the committee, the final electronic thesis is submitted to the library. Note: If the final electronic thesis has not been submitted to the MSE library (https://www.library.jhu.edu/library-services/electronic-theses-dissertations/) by the end of the second semester, the research advisor may assign an "I" [incomplete] grade until all conditions are met.

2. Once the library has accepted the final electronic thesis document, the student will receive an email notification of acceptance. The student must forward this email to ep-meche-thesis@jh.edu with the final thesis document and defense presentation.

3. Upon receiving the acceptance email, the thesis advisor needs to submit a grade in SIS or grade change form if not completed in time. The thesis advisor should also send a final notification email to the Mechanical Engineering leadership team at ep-meche-thesis@jh.edu.

Research and Travel Funds

The Engineering for Professionals (EP) Travel Fund provides graduate students with financial support to present program-related work at a scholarly, scientific, or professional conference. Eligible students may apply to receive reimbursement for up to $2,000 per academic year toward conference fees, travel, and other expenses associated with presenting their work. The following link provides additional information on student travel funds: https://ep.jhu.edu/student-services/student-travel-fund/

Potential Mechanical Engineering Thesis Advisors

The following Mechanical Engineering faculty members may be available to supervise two-semester thesis projects.

Name	Contact Info	Courses Taught	Areas of Interest
Austin DiOrio	adiorio2@jhu.edu 240-228-3527	535.633 Intermediate Heat Transfer	Particle impact erosion; aerothermal heating; thermochemical erosion; hypersonics; heat transfer
Christopher Stiles	cstiles1@jhu.edu	535.610 Computational Methods of Analysis	Applied AI/ML; Computational methods (MD/LBM/FEM/SPH/CFD); Analysis
Craig Przybyla	craig.przybyla@jhu.edu	535.720 Mechanics of Composite Materials and Structures	Composites
Jaafar El-Awady	jelawady@jhu.edu	535.607 Mechanics of Solids and Structures: Theory and Applications I 535.643 Plasticity	Multiscale Materials Modeling; Deformation of Fracture of Materials; Machine Learning for Materials Design
Jin Seob Kim	jkim115@jhu.edu	535.612 Intermediate Dynamics 535.623 Intermediate Vibrations 535.724 Dynamics of Robots and Spacecrafts	Robotics and Computational Biology; Kinematical and Dynamical modeling of robotic systems; Mathematical and computational modeling of biological systems
Kamal Choudhary	kchoudh2@jh.edu	535.737 Multiscale Modeling and Simulation of Mechanical Systems	Machine learning; Computational materials science; Multiscale modeling; graph neural networks; large language models
Mark Kedzierski	mark.kedzierski@jhu.edu 540-955-1390	535.634 Applied Heat Transfer	Thermal sciences; thermodynamics; fluid dynamics; two-phase heat transfer; energy storage
Michael Boyle	michael.boyle@jhuapl.edu	535.627 Computer-Aided Design 535.632 Applied Finite Elements	Mechanical Design; Finite Element Analysis
Michael Squibb	msquibb1@jh.edu 410-382-1637	535.771 Naval Architecture Design	Naval Architecture; Maritime Engineering; Fluid Mechanics; Systems Engineering/MBSE
Michael Kutzer	mkutzer1@jh.edu	535.622 Robot Motion Planning	Advanced/Robotics Additive Manufacturing
Ronnie Fesperman	rfesper1@jhu.edu 240-477-9470	535.660 Precision Mechanical Design	Machine and instrumentation design
Shane Lani	slani1@jhu.edu	535.614 Fundamentals of Acoustics 535.773 Acoustical Oceanography	Acoustics and the many applications of Acoustics
Tyler Flynn	tflynn11@jhu.edu	535.773 Acoustical Oceanography	Acoustics, oceanography, vibrations, phased arrays, signal

			processing, structural health monitoring
Zhiyong Xia	zxia5@jh.edu	535.633 Intermediate Heat Transfer 535.684 Modern Polymeric Materials	Polymeric Materials; Microplastics; Biomaterials; Stimulus Responsive Materials; Energetic Materials; Thermal Analysis and Heat Transfer

Mechanical Engineering Leadership Team

Program Chair
Jaafar El-Awady
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Revision History

Date	Changes
10-24-2024	V1
2-27-2025	V2 Advisor List Updated
3-14-2025	V3 Additional advisors added