JOHNS HOPKINS
UNIVERSITY

Department of
Mechanical
Engineering

M.S.E.
Graduate Student Advising Manual

2016-2017

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1. Welcome!

Welcome to the Department of Mechanical Engineering! This manual is designed to serve as a guide for Master of Science in Engineering (M.S.E.) students in the Department of Mechanical Engineering to work more effectively during their time at JHU, and to describe the basic academic requirements for the M.S.E. degree. The detailed planning of an academic program, such as choosing courses and the like must be done with the guidance of the faculty advisor.

This manual covers policies and procedures, and offers suggestions regarding our program. Please address issues and questions not covered in this manual with these professors and staff:

- Academic Program Manager - Mike Bernard
- Academic Program Coordinator - Kevin Adams
- Your faculty advisor
- Administrator - Marty Devaney
- Director of Graduate Studies, Professor Rajat Mittal
- Department Chair, Professor Gretar Tryggvason

This document is not phrased to professional legal standards. You will want to clarify any unclear issues with the department.

2. General Information

2.1. Residency Requirements

Once students begin their graduate course of study toward a degree, they must complete a minimum of two consecutive semesters of registration as a full-time, resident graduate student. To qualify as a resident student, the student must be present on campus and working toward fulfilling the requirements for the degree. Complete information is available at http://homewoodgrad.jhu.edu/academics/graduate-board/new-grad-board-residency-page/.

2.2. English Language Program for International Students

The English Language Program for International Teaching Assistants of the Language Teaching Center offers courses designed to make a student's graduate experience as effective and enjoyable as possible.

Enrollment in the course AS.370.602 Accent Reduction is **required** for all new international master's graduate students whose native language is not English, whose speaking score in the TOEFL is <27, and who wish to be considered for Teaching Assistant positions.

This remedial course and its optional subsequent course AS.370.603 Culture and Communication in American Academia will improve English language skills, teach American classroom culture, and offer pointers in teaching techniques. International graduate students cannot serve as a Teaching Assistant until AS.370.602 Accent Reduction is successfully completed.

2.3. Required Introductory Courses and Tutorials

There are three introductory courses and tutorials that most or all graduate students must take. These courses cannot be counted toward course requirements listed for the M.S.E. degree.

2.3.1. Responsible Conduct of Research

Many M.S.E. and all Ph.D. graduate students will be required to take the "Responsible Conduct of Research" course.

- M.S.E. students receiving payment for research or who are conducting research used to help complete degree requirements must first complete the online training course (AS.360.624) before conducting research and receiving payment.
- M.S.E. students receiving payment from NIH Training Grants must take the in-person training course (AS.360.625).
- Each Ph.D. student must complete take the in-person training course (AS.360.625) before the start of his or her fourth semester of the program. Failure to complete the course could result in the loss of funding.

Information is available at http://engineering.jhu.edu/wse-research/resources-policies-forms/responsible-conduct-of-research/.

2.3.2. Academic Ethics

Graduate students are automatically enrolled in the online tutorial EN.500.603 Academic Ethics, which teaches academic and ethical responsibilities. This 20-minute tutorial must be completed in the first eight weeks of the student's first semester. The Whiting School of Engineering will notify new students when the course is available.

2.3.3. Research Laboratory Safety

All students working in a research laboratories should take the course EN.500.401 Research Laboratory Safety, an introduction to laboratory safety, including chemical, biological, radiation, and physical hazards. Students learn hazard assessment techniques, laboratory emergencies, and general lab standards for Whiting School of Engineering. The class will feature hands-on exercises with real-life experiments. This course should be taken before beginning work in a research laboratory.

2.4. Advisors

In most cases, a graduate student's academic advisor will be a full-time faculty member in the Department of Mechanical Engineering.

Occasionally, a student may partake in specialized research where he or she will work with a professor in another department. If this is the case, the student will have two advisors:

- A research advisor, whose primary appointment is in an outside department and may or may not have a secondary appointment in Mechanical Engineering
- An academic advisor whose primary appointment is in Mechanical Engineering.

3. The M.S.E. Degree Program

The Master of Science in Engineering (M.S.E.) degree requirements, along with general information, will be described here.

3.1. University and Whiting School Degree Requirements

Visit http://engineering.jhu.edu/graduate-studies/academic-policies-procedures-graduate/ for information on school-wide requirements, such as:

- Two semesters of full-time course registration, also called "residency."
- Course registration every semester.
- Completion of academic ethics and responsible conduct of research courses.
- MSE essay submission.

3.2. M.S.E. Mechanical Engineering - Degree Requirements

The M.S.E. degree may be a final degree or it may be earned *en route* to a Ph.D. degree. Either way, the requirements remain the same, and the advisor's approval is required. Students who complete the M.S.E. degree are not automatically admitted to the Ph.D. program.

The requirements for an M.S.E. in Mechanical Engineering are described in Sections "A" and "B," where both sections must be met:

SECTION A: Satisfactory completion of eight one-semester advanced courses approved by your advisor, as follows:

a) At least four courses must be at the graduate level (full-time programs xxx.600 or higher, Engineering for Professionals xx5.4xx or higher).

b) No more than four courses may be at the intermediate/advanced undergraduate level (full-time programs xxx.300 – xxx.499, Engineering for Professionals xx5.3xx).

c) At least two courses should be in applied mathematics, numerical analysis, or computational methods. (This requirement can be waived in writing by your advisor, if sufficient prior preparation in these areas can be demonstrated).

d) Independent Study, EN.530.600 MSE Graduate Research, Graduate Research, or Special Studies are not eligible courses to help complete Section A's requirement.

SECTION B: In addition to the eight courses above, students must also complete either two more courses or a thesis:

a) *Either…* Two additional one-semester graduate-level courses (xxx.600–xxx.799) approved by your advisor, (for M.S.E. students only: one of these two courses can be EN.530.600 MSE Graduate Student Research)

b) *…Or* An M.S.E. essay (the official title of master's theses at Johns Hopkins) acceptable to your advisor and one other reader.

At least half of all courses counted toward the master's degree must be EN.530.xxx Mechanical Engineering or EN.535.xxx Engineering for Professionals' Mechanical Engineering but no more than two courses may be chosen from the Engineering for Professionals program.

Students must register for the course EN.530.602 Master's Thesis Research and Writing every semester that he or she works on master's thesis research and writing.

See Section 3.6.5 for information on the possibility of double-counting courses from a previous degree.

3.3. Course Levels

Subject to the degree requirement restrictions, one-semester advanced courses include:

Graduate

- Full-time program courses numbered xxx.6xx and higher (e.g. EN.530.621)
- Engineering for Professionals program courses numbered xx5.4xx and higher (e.g. EN.535.415).
- For courses taken before Fall 2017, some graduate courses in Computer Science numbers 600.4xx and are considered graduate-level courses. Please contact the Computer Science department to confirm their graduate course offerings or visit http://cs.jhu.edu.

Undergraduate

- Full-time program courses numbered xxx.300-xxx.499
- Engineering for Professionals program courses numbered xx5.300-xx5.399.

3.4. Course Selection

The courses taken to complete the M.S.E. degree requirements should be selected based on each individual student's interests and strengths. Students should meet with their advisors early to plan their courses for the entire program, as many courses require prerequisites.

The following courses are suggested for M.S.E. students with particular interests. Students should discuss these and possibly other courses not listed with their advisors when making their selections.

3.4.1. EN.530.600 Master's Graduate Research – only for "all-course" master's

The EN.530.600 Master's Graduate Research course is intended to give a research experience to those pursuing an "all-course" master's degree. This course will count as one of the ten courses needed for the "all-course" master's degree. It cannot be taken by those pursuing a "thesis/essay" master's degree.

The course is generally the equivalent of three credits and lasts one semester. The research must be conducted at the level of at least a master's degree, as determined by a student's advisor.

Approval of proposed research must be obtained from one's advisor before registering for the course. When registering for the course, the advisor's "section" should be selected to allow him or her to grade the course when complete. The course is subject to the usual academic performance requirements to count toward the degree.

3.4.2. EN.530.602 Master's Thesis Research and Writing – only for "thesis" master's

The EN.530.602 Master's Thesis Research and Writing course is intended to recognize the research and writing work to those pursuing a "thesis" master's degree. It cannot be taken by those pursuing an "all-course" master's degree.

Students writing a thesis must enroll in this course at least once and subsequently in each semester where thesis work is done.

This "Pass/Fail" course **does not** count as one of the eight courses required in addition to the thesis. The course is generally the equivalent of six credits and can be taken in one semester or split into three-credit courses taken over two semesters. If a student needs subsequent semesters to continue thesis work, he or she can simply register for the same course each semester.

3.4.3. Aerospace – Suggested Courses

Upper-level Undergraduate Courses

- EN.530.328 Fluid Mechanics II
- EN.530.418 Aerospace Structures and Materials
- EN.530.425 Mechanics of Flight
- EN.530.432 Jet and Rocket Propulsion
- EN.530.435 Guidance and Control of Flight Vehicles
- EN.530.444 Computer-Aided Fluid Mechanics and Heat Transfer
- EN.530.470 Space Vehicle Dynamics and Control

Graduate Courses

- EN.530.621 Fluid Dynamics I
- EN.530.622 Fluid Dynamics II
- EN.530.624 Dynamics of Robots and Spacecraft
- EN.530.625 Turbulence
- EN.530.726 Hydrodynamic Stability
- EN.530.767 Computational Fluid Dynamics

3.4.4. Biomechanics - Suggested Courses

Upper-level Undergraduate Courses

- EN.530.410 Biomechanics of the Cell
- EN.530.426 Biofluid Mechanics
- EN.530.441 Introduction to Biophotonics
- EN.530.445 Introduction to Biomechanics
- EN.530.446 Experimental Methods in Biomechanics
- EN.530.448 Biosolid Mechanics
- EN.530.473 Molecular Spectroscopy and Imaging
- EN.530.476 Locomotion in Mechanical and Biological Systems
- EN.530.485 Physics and Feedback in Living Systems
- EN.530.486 Mechanics of Locomotion
- EN.530.495 Microfabrication Lab

Graduate Courses

- EN.530.610 Statistical Mechanics in Biological Systems
- EN.530.633 Mechanics of the Biological Systems and Biophysical Methodologies
- EN.530.672 Biosensing and BioMEMS
- EN.530.676 Locomotion in Mechanical and Biological Systems
- EN.530.686 Mechanics of Locomotion

Courses Outside Mechanical Engineering

- EN.510.606 Chemical and Biological Properties of Materials
- EN.510.607 Biomaterials II
- EN.540.626 Biomacromolecules at the Nanoscale
- EN.580.451 Cell and Tissue Engineering Laboratory 1
- EN.580.452 Cell and Tissue Engineering Laboratory 2
- EN.580.641 Cellular Engineering
- EN.580.642 Tissue Engineering

3.4.5. Energy - Suggested Courses

Upper-level Undergraduate Courses

- EN.530.328 Fluid Mechanics II

Graduate Courses

- EN.530.632 Convection
- EN.530.637 Energy and the Environment
- EN.530.664 Energy Systems Analysis

Courses Outside Mechanical Engineering
- EN.510.405 Materials Science of Energy Technologies
- EN.520.627 Photovoltaics and Energy Devices
- EN.540.619 Project in Design: Alternative Energy
- EN.570.607 Energy Policies and Plan Models
- EN.570.612 Infrastructure Modeling, Simulation, and Analysis

3.4.6. Fluid Mechanics - Suggested Courses

Upper-level Undergraduate Courses
- EN.530.328 Fluid Mechanics II
- EN.530.426 Biofluid Mechanics
- EN.530.432 Jet and Rocket Propulsion
- EN.530.444 Computer-Aided Fluid Mechanics and Heat Transfer

Graduate Courses
- EN.530.621 Fluid Dynamics I
- EN.530.622 Fluid Dynamics II
- EN.530.625 Turbulence
- EN.530.632 Convection
- EN.530.726 Hydrodynamic Stability
- EN.530.767 Computational Fluid Dynamics

Courses Outside Mechanical Engineering
- AS.270.425 Earth and Planetary Fluids
- AS.270.661 Planetary Fluid Dynamics
- EN.540.652 Advanced Transport Phenomena
- EN.560.682 Introduction to Water Wave Mechanics

3.4.7. Mechanics and Materials - Suggested Courses

Upper-level Undergraduate Courses
- EN.530.405 Mechanics of Advanced Engineering Structures
- EN.530.418 Aerospace Structures and Materials
- EN.530.430 Applied Finite Element Analysis
- EN.530.448 Biosolid Mechanics

Graduate Courses
- EN.530.605 Mechanics of Solids and Materials
- EN.530.606 Mechanics of Solids and Materials II
- EN.530.642 Plasticity

- EN.530.656 Deformation Mechanisms
- EN.530.730 Finite Element Methods
- EN.530.748 Stress Waves, Impacts and Shockwaves

Courses Outside Mechanical Engineering

- EN.540.640 Micro/Nanotechnology: Science / Engineering of Small Structures
- EN.510.601 Structure of Materials
- EN.510.604 Mechanical Props of Materials
- EN.560.604 Solid Mechanics for Structures

3.4.8. Robotics and Systems, Modeling, and Controls - Suggested Courses

Upper-level Undergraduate Courses

- EN.530.420 Robot Sensors/Actuators
- EN.530.421 Mechatronics
- EN.530.470 Space Vehicle Dynamics and Control
- EN.530.485 Physics and Feedback in Living Systems

Graduate Courses

- EN.530.603 Applied Optimal Control
- EN.530.624 Dynamics of Robots and Spacecraft
- EN.530.646 Robot Devices, Kinematics, Dynamics, and Control
- EN.530.649 Adaptive Systems and System Identification
- EN.530.653 Advanced Systems Modeling
- EN.530.676 Locomotion in Mechanical and Biological Systems
- EN.530.678 Nonlinear Control and Planning in Robotics
- EN.530.686 Mechanics of Locomotion

Courses Outside Mechanical Engineering

- EN.580.616 Introduction to Linear Dynamical Systems
- EN.520.601 Introduction to Linear Systems Theory
- EN.520.621 Introduction to Nonlinear Systems
- AS.600.436 (or AS.601.463 beginning in Fall 2017) Algorithms for Sensor-Based Robotics (undergrad)
- AS. 600.636 (or AS.601.663 beginning in Fall 2017) Algorithms for Sensor-Based Robotics (grad)

3.4.9. Applied Mathematics, Numerical Analysis, and Computational Methods - Suggested Courses

The master's degree requirements state that at least two courses should be in applied mathematics, numerical analysis, or computational methods. With advisor approval, any of these courses can be applied to that requirement, though this is not an exhaustive list.

Upper-level Undergraduate Courses

- EN.530.371 Quantitative Applications in Mechanical Engineering
- EN.530.430 Applied Finite Element Methods

Graduate Courses

- EN.530.653 Advanced Systems Modeling
- EN.530.761 Mathematical Methods of Engineering I
- EN.530.766 Numerical Methods
- EN.530.767 Computational Fluid Dynamics

Courses Outside Mechanical Engineering

- Most upper-undergraduate or graduate level courses offered by the Applied Mathematics department (550.3xx or 553.3xx or higher)
- EN.535.441 Mathematical Methods for Engineers (Engineering for Professionals)
- EN.560.601 Applied Math for Engineers
- EN.560.730 Finite Element Methods
- EN.615.441 Mathematical Methods for Physics and Engineering (Engineering for Professionals)
- Some upper-undergraduate or graduate level courses offered by the Computer Science department (EN.600.3xx or EN.601.3xx or higher)

3.4.10. Frequency of Course Offerings

Graduate courses are offered in specific semesters, and sometimes in alternating years. Below is a timeframe of elective course offerings listed in the anticipated order of next offering.

These offerings are subject to change due to instructor sabbaticals or unusual situations. Please confirm these offerings when planning your course schedule.

MECHANICAL ENGINEERING – COURSES – ANTICIPATED OFFERINGS					
Semester	**Mathematics / Energy**	**Robotics**	**Fluid Mechanics**	**Mechanics and Materials**	**Biomechanics**
Fall 2017 (confirmed)	- EN.530.430 Applied Finite Element Analysis - EN.530.730 Finite Element Methods -EN.530.761 Math Methods for Engineers - EN.530.766 Numerical Methods	- EN.530.420 Robot Sensors and Actuators - EN.530.424 / 624 Dynamics of Robots and Spacecraft - EN.530.646 Robot Devices, Kinematics, Dynamics, and Control -EN.530.647 Adaptive Systems - EN.530.691 Haptic Interface Design for Human-Robot Interaction	-EN.530.418 Aerospace Structures and Materials - EN.530.621 Fluid Dynamics I - EN.530.625 Turbulence - EN.530.632 Convection	- EN.530.418 Aerospace Structures and Materials - EN.530.605 Mechanics of Solids and Materials I - EN.530.455 (undergrad) / EN.530.655 (grad) Additive Manufacturing	- EN.530.410 Biomechanics of the Cell - EN.530.445 Introduction to Biomechanics - EN.530.448 Biosolid Mechanics - EN.530.473 Molecular Spectroscopy and Imaging - EN.530.495 Microfabrication Laboratory - EN.530.633 Mechanics of the Biological Systems and Biophysical Methodologies
Spring 2018 (anticipated)	- EN.530.464/664 Energy Systems Analysis	- EN.530.421 Mechatronics - EN.530.649 System Identification - EN.530.653 or EN.530.654 Advanced Systems Modeling I or II - EN.530.486/686 Mechanics of Locomotion - EN.530.707 Robot System Programming	- EN.530.328 Fluid Mechanics II - EN.530.425 Mechanics of Flight - EN.530.426 Biofluid Mechanics - EN.530.432 Jet and Rocket Propulsion - EN.530.622 Fluid Dynamics II - EN.530.767 Computational Fluid Dynamics	- EN.530.381 Engineering Design Process - EN.530.606 Mechanics of Solids and Materials II - EN.530.681 TEM: Practice and Applications - EN.530.748 Stress Waves, Shocks, and Impacts	- EN.530.426 Biofluid Mechanics - EN.530.441 Intro to Biophotonics - EN.530.446 Experimental Biomechanics - EN.530.480 Image Processing and Data Visualization - EN.530.486 / EN.530.686 Mechanics of Locomotion - EN.530.628 Nonlinear Dynamics in Mechanics and Biology - EN.530.672 Biosensing and BioMEMS
Fall 2018 (anticipated)	- EN.530.430 Applied Finite Element Analysis -EN.530.761 Math Methods for Engineers	- EN.530.420 Robot Sensors and Actuators - EN.530.424 / EN.530.624 Dynamics of Robots and Spacecraft - EN.530.603 Applied Optimal Control - EN.530.646 Robot Devices, Kinematics, Dynamics, and Control	- EN.530.621 Fluid Dynamics I - EN.530.726 Hydrodynamic Stability - EN.530.766 Numerical Methods	- EN.530.405 Mechanics of Advanced Engineering Structures - EN.530.605 Mechanics of Solids and Materials I - EN.530.656 Mechanisms of Deformation and Fracture - EN.530.790 AFEM Multi-Scale	- EN.530.445 Introduction to Biomechanics - EN.580.451 Cell and Tissue Engineering Laboratory - EN.530.473 Molecular Spectroscopy and Imaging - EN.530.495 Microfabrication Laboratory - EN.530.610 Statistical Mechanics in Biological Systems - EN.530.633 Mechanics of the Biological Systems and Biophysical Methodologies
Spring 2019 (anticipated)	- EN.530.464/664 Energy Systems Analysis	- EN.530.421 Mechatronics - EN.530.470 Space Vehicle Dynamics and Control - EN.530.486 / EN.530.686 Mechanics of Locomotion - EN.530.707 Robot Systems Programming	- EN.530.435 Guidance and Control of Flight Vehicles - EN.530.622 Fluid Dynamics II - EN.530.726 Hydrodynamic Stability - EN.530.767 Computational Fluid Dynamics	- EN.530.417 / EN.530.618 Fabricatology - EN.530.606 Mechanics of Solids and Materials II - EN.530.612 Computational Solid Mechanics - EN.530.618 Fabricatology	- EN.530.441 Intro to Biophotonics - EN.530.446 Experimental Biomechanics - EN.530.610 Statistical Mechanics in Biological Systems - EN.530.486 / EN.530.686 Mechanics of Locomotion

Table 1 – Anticipated Course Frequencies

3.5. Course Registration and Credits

3.5.1. Credits

Effective Fall 2016, all Whiting School of Engineering graduate students will register for courses with credits.

- The Mechanical Engineering degree requirements do not change for the number or types of courses.
- All Whiting School of Engineering (WSE) graduate-level courses (.600-level or higher) have credits assigned to them.
- To maintain full-time status, all WSE graduate students must be enrolled in at least 9 credits.
- Students can achieve full-time status by registering for any combination of courses and seminars, as approved by one's advisor. ISIS is set to select appropriate credits:
    - Seminars – 1 credit
    - WSE courses, both undergraduate and graduate – 3 or 4 credits
    - EN.530.600 Master's Graduate Research – 3-10 credits
    - EN.530.602 Master's Thesis Research and Writing – 3-10 credits – enroll for this "Pass/Fail" course when doing thesis research and writing
    - NOTE:
        - Audited courses do not count toward a full-time credit load.
        - Krieger School of Arts and Sciences' graduate-level courses will not have credits listed in ISIS, but will be recognized as 3-4 credits toward one's full-time credit load.
- Students enrolled in fewer than 9 credits per semester are part-time, which may affect residency requirements for all and visa concerns for international students. Please ask your advisor or Academic Program Manager Mike Bernard your questions before registering or changing a course from "letter grade" to "audit."
- Visit the Whiting School's Frequently Asked Questions page at http://homewoodgrad.jhu.edu/academics/wse-graduate-credit-hours/ for more information.

3.5.2. Interdivisional Course Registration

Students may need to register in another division, like the Engineering for Professionals program or in any of Hopkins's eight other schools. Registration for courses in these areas must be done in person at the Registrar's office in Garland Hall.

3.6. Course Information and Policies

3.6.1. Engineering for Professionals Courses

The Whiting School of Engineering's Engineering for Professionals (EP) program offers a variety of classroom and online courses. EP courses at .400-level or above are considered to be graduate level courses. EP courses at the .300-level are counted as intermediate/advanced undergraduate courses. Visit http://ep.jhu.edu/ for information.

3.6.2. Required Mechanical Engineering Courses

At least half of the courses taken to complete the M.S.E. degree (not including those listed in Section 2.3), including at least two .600- or .700-level courses, must be offered by the Mechanical Engineering department or the Engineering for Professionals' Mechanical Engineering program, whose course numbers begin with EN.530.xxx and EN.535.xxx respectively.

3.6.3. Only One C-type Grade Can Count Toward the M.S.E.

No more than one C-type grade (C+, C, or C-) can be counted toward the master's degree course requirements.

3.6.4. "Pass" Grade Not Accepted for Students Starting Fall 2014 or Later

Effective for all graduate students matriculating in the Fall 2014 semester and later, Pass grades will no longer be accepted for courses counting toward the Master's degree.

Graduate students who matriculated before the Fall 2014 semester are allowed to use Pass grades only with their advisor's approval.

Deviations to this policy must be explicitly authorized in writing by the Mechanical Engineering student advisor before the official last day for dropping courses established by the Registrar's Office.

3.6.5. Double-Counting Courses

There may be opportunities to double-count up to two courses taken for previous degrees, but only with the permission of the master's faculty advisor.

The Mechanical Engineering department follows the Whiting School of Engineering policy on double-counting courses at https://engineering.jhu.edu/graduate-studies/academic-policies-procedures-graduate/.

3.7. Part-Time Status and Tuition

Master's students of the Department of Mechanical Engineering may become eligible for part-time status.

"ALL-COURSE" MASTER'S STUDENTS
Master's students must register full-time most or all semesters for a minimum of nine credits. If in a student's final semester, less than nine credits are needed to complete the degree requirements, students can switch to part-time status.

"ESSAY/THESIS" MASTER'S STUDENTS
After meeting the minimum two-semester "full-time" residency requirement - where a student pays full-time tuition for a minimum of two semesters - Whiting School master's students who have not yet completed the research to the point where the final and sole activity is essay/thesis writing must maintain their "residency" status, but can register "part-time" by registering for eight credits or less per semester.

For each semester where essay/thesis research and writing occurs, students must register for three credits of EN.530.602 Master's Thesis Research and Writing.

PART-TIME TUITION
Students are charged tuition per-credit, which in the 2016-17 academic year is $1,680 per-credit. The student's advisor or the department may choose to cover this charge, but that is not guaranteed.

COURSE REGISTRATION
The Mechanical Engineering department requires enrollment in courses:

- Any remaining courses for the degree – 3-4 credits each
- EN.530.602 Master's Thesis Research and Writing – 3-10 credits – for essay/thesis master's students only.

PART-TIME RESTRICTIONS

- Part-time students are ineligible to work as a student worker, including as a Teaching Assistant, and will not be eligible for graduate student salary.
- Part-time students enrolled in the University health insurance must pay the full premium, which in 2017-18 is $940 per semester.

HOW TO OBTAIN PART-TIME STATUS

- Contact Academic Program Manager Mike Bernard to confirm eligibility to switch.
- International students must first obtain approval from the International Office.

RESOURCES

- Whiting School Graduate Credit Hours: http://homewoodgrad.jhu.edu/academics/wse-graduate-credit-hours/

3.8. Non-Residency Status and Tuition

"ALL-COURSE" MASTER'S STUDENTS
Students taking the "all-course" master's degree are not eligible for non-residency status.

"ESSAY/THESIS" MASTER'S STUDENTS
Whiting School graduate students are eligible for non-residency status when all degree requirements except the writing of the master's essay/thesis are complete. The essay/thesis research must be finished before the non-resident status can be requested.

Whiting School graduate students are typically granted only one semester of non-residency with the expectation that the essay/thesis will be written, read, and approved in that semester. The Whiting School will consider exception requests for an additional semester of non-residency.

NON-RESIDENT TUITION
Non-resident students pay only 10% of the full-time tuition but will still have all the privileges of full-time students such as access to campus services and faculty advising.

NON-RESIDENT RESTRICTIONS
Non-resident students cannot enroll in courses and would lose the Whiting School's

financial support for health insurance. The department could choose to cover health insurance charges, but that is not guaranteed.

Non-resident students are automatically enrolled in health insurance, but can waive the insurance, if eligible for waiver by proof of enrollment in another health insurance plan with similar coverage.

To maintain non-resident status, students will have to register for non-resident status each semester and provide a letter explaining their progress toward the degree's completion.

HOW TO OBTAIN NON-RESIDENT STATUS

- Contact Academic Program Manager Mike Bernard to confirm eligibility for non-resident status.
- Complete the Non-Resident Status for Whiting School form, which Mike will send to the Whiting School Academic Affairs office for review and approval.
- If the Non-Resident request is denied, a student may be eligible for part-time status.

RESOURCES

- Graduate Residency and Registration Policies: http://homewoodgrad.jhu.edu/academics/graduate-board/new-grad-board-residency-page/
- Graduate Board Forms, which include the Non-Resident Application and the Non-Resident Annual Report: http://homewoodgrad.jhu.edu/academics/graduate-board/policies-and-forms/
- Whiting School of Engineering Policy on Health Insurance page: http://engineering.jhu.edu/graduate-studies/academic-policies-procedures-graduate/ (then select the Health Insurance tab)

3.9. MSE Essay / Thesis

3.9.1. Eligible MSE Essay Readers

While the University requires one reader for master's essays, departments are allowed to enforce stricter standards by requiring more than one reader.

The Mechanical Engineering department requires two readers, the first one being the person (ordinarily a member of the Department's faculty) who supervised the student's project. The second reader is usually any duly appointed member of a department holding the rank of assistant professor or higher (excluding lecturers). The advisor will consult with the Department Chair if there are questions of eligibility for a proposed second reader, or if the proposed second reader is from outside Johns Hopkins University.

3.9.2. Avoid Tuition Payments in Grace Period

You may avoid paying tuition in your last semester if you complete and submit your essay in the Grace Period:

- Fall - within the first eight weeks of the semester
- Spring - within the first four weeks of the semester

If you plan to submit your essay during the tuition Grace Period, instead of paying tuition, you can submit a Tuition Deferral Form, available at http://www.jhu.edu/~studacct/forms/index.htm. A department representative must sign the form before submitting it to the Student Accounts office.

3.9.3. Submission and Printing of Essays

Masters essays will be submitted only by electronic media. For information, contact David Reynolds, the Library ETC Coordinator at 410-516-7720 or dissertations@jhu.edu.

To celebrate degree accomplishments, the department will order bound and printed copies of essays for the student, his or her advisor and for the department library. The Academic Administrative staff will arrange for printing and shipping.

3.10. Academic Performance Requirements

A course is satisfactorily completed if a grade from A+ to B- is obtained. Grades of C+ or lower are evidence of unsatisfactory academic performance.

A student earning one grade of D or F or two C+, C, or C- grades will receive notification, with a copy to his or her advisor, of academic performance concerns and an explanation that a second D or F or a third C+, C, or C- grade for a master's student will result in termination from the program.

3.11. Degree Completion

3.11.1. Degree Completion Deadlines

The master's degree completion schedule and deadlines are available at http://engineering.jhu.edu/graduate-studies/academic-policies-procedures-graduate/. Be sure to meet the deadlines when completing your degree and related applications to graduate.

3.11.2. Degree Completion Time Limit

The Whiting School of Engineering states that students must earn the master's degree within five consecutive academic years (10 semesters). Only semesters during which a student has a university-approved leave of absence are exempt from the ten semester limit; otherwise, all semesters from the beginning of the student's graduate studies—whether the student is a resident or not—count toward the ten semester limit.

3.11.3. Degree Completion Forms

Students who have completed the requirements for the M.S.E. degree should complete both the "Application for Graduation" and the "Certificate of Departmental Approval" forms.

Visit the "Preparing to Graduate" section of the Graduate Academic Advising page at http://me.jhu.edu/graduate-studies/academic-advising-graduate/ for more information.

3.12. Switching from an M.S.E. to Ph.D. Degree

Masters students may be given an opportunity to switch to the Ph.D. program. Students with sufficient interest who demonstrate exemplary academic performance may request to switch their degree program after at least one semester. Most students who switch do so usually by the end of their third semester, in time to take the Departmental Qualifier Examination (see the JHU Mechanical Engineering Ph.D. Student Advising Manual).

The process to switch programs is as follows:

- The student seeks a Mechanical Engineering professor willing to advise a Ph.D. student.
- The student writes an updated Statement of Purpose that expresses his or her goals for academic knowledge and research at the Ph.D. level.
- The professor writes a recommendation letter stating his or her willingness to advise the student, as well as any financial aid being offered.
- The Academic Program Manager or designee will enter an online application to the University graduate application system or have the original application cloned by Graduate Admissions.
- The student will receive and accept admission to the Ph.D. program.
- The Graduate Admissions office, Registrar, and the Office of International Student Scholar Services (for international students) will be notified of the change in degree.
- The student will begin studies and research in the Ph.D. program to which he or she is admitted.

4. Miscellaneous Academic Information

4.1. Graduate Student Annual Evaluations

The Whiting School of Engineering requires that once per academic year all full-time Homewood graduate programs carry out a written evaluation of all doctoral and master's students conducting thesis research. The evaluation process includes the opportunity for the advisor to initiate the student evaluation on his or her research and academic progress.

Mechanical Engineering Graduate Program Committee, with the support of the faculty and the Mechanical Engineering Graduate Student Association (MEGA) created a formal annual evaluation form, thinking it is good practice and a worthwhile investment. The evaluation form is in the back of this manual and at http://me.jhu.edu/graduate-studies/academic-advising-graduate/.

In December, advisors will initiate the evaluation process with their doctoral students and master's students conducting thesis research, who will be expected to complete the evaluation form and meet with their advisors to discuss progress and goals for the upcoming year. The student and advisor will both sign the evaluation, after which it will be delivered to the Academic Administrative staff before the first day of class in the Spring semester, usually the fourth Monday in January.

Note: For 2017, the submission due date will be extended to early-March and the due date for future years will likely revert to late-January.

4.2. Departmental Seminars

Part of the Johns Hopkins graduate experience is to become informed about and learn to evaluate the research done by others, both here at Johns Hopkins and at leading institutions worldwide. The Mechanical Engineering Department hosts weekly seminars every Thursday during the Fall and Spring semesters. The Fluids and Mechanics and Materials groups also hold weekly student seminars on Fridays.

There are also a number of special seminars in the department and regular seminars in other departments that may be of interest, such as Materials Science and Engineering, Earth and Planetary Sciences, and Biomedical Engineering; and Centers, such as CEAFM, CAMCS, HEMI, and CISST.

M.S.E. students are encouraged, although not required, to attend at least some of these seminars.

4.3. Teaching Assistant Positions

To assist in the teaching functions of the Department, Teaching Assistant (TA) opportunities are provided to students to grade homework and papers, conduct laboratories and hold office hours. TAs are remunerated for their efforts according to a formula that quantifies the number of hours required for a particular course, multiplied by an hourly rate, to be determined by the beginning of the academic year.

Position openings are announced at the beginning of each semester. Any student interested in being a Teaching Assistant for a particular course or instructor is advised to contact that instructor well before the start of the semester.

4.4. Ethics

Unethical behavior can lead to a student's expulsion from the program. Graduate students are therefore expected to be **aware** of what actions constitute unethical behavior. For example, students must submit work that represents their own efforts. Whenever ideas or results are drawn from other sources, those sources must be cited in the submitted or presented work. **Unless otherwise explicitly permitted by the instructor for that course, students must not collaborate or discuss any assignments prior to submission of the work.** Students must be aware of and adhere to the ethical issues associated with the use of, and in particular the duplication of computer software and must abide by the rules of use set by the developer.

5. Administration

5.1. Department Offices

The Mechanical Engineering Administrative Office is located in Latrobe 223. The office provides services and assistance to faculty, staff, graduate students, and undergraduate students. All purchasing, payroll, budget and accounting transactions, shipping, receiving, and other administrative services are handled through this office.

5.2. Supplies and Services

Most of the services you will need will be provided through the Department Office.

COPIER and SCANNER - Graduate students are welcome to use the department copier and scanner for tasks related to the conduct of research or the academic pursuits of the faculty. Informal training of use of the copier and its features is available. In unusual circumstances, the copier may be used on a limited basis for personal needs.

FAX MACHINE - The number for the fax machine in Latrobe 223-A is 410-516-4316. Since many people rely on this machine, incoming faxes must be labeled or have a fax cover sheet. Students may use the outgoing fax for communication related to the conduct of research or the academic pursuits of the faculty.

This is how to dial a fax number for the following types of numbers:

- Local Number in the Baltimore area, with area codes 410 and 443:
  Dial 9, the area code and telephone number; e.g. 9-410-555-3818.
- Long Distance numbers in Maryland (area codes 240, 301, some numbers in area codes 410 and 443), the United States, Canada, and Caribbean locations using a three-digit Area Code: *Dial 9, 1, the area code and telephone number; e.g. 9-1-717-555-8203.*
- Elsewhere: *Dial 9, 011, the country code and telephone number; e.g. 9-011-39-555241156.*

STUDENT MAILBOXES - All graduate students have a mailbox located in Latrobe 223. Mail is ordinarily distributed daily. It is important to check your mailboxes regularly. The administrative staff will help with questions regarding pickup, delivery, postage, and Express Mail services.

SHIPPING AND RECEIVING - FedEx regularly delivers to the Department Office. FedEx picks up on demand and delivers as required. Other carriers may be used in special circumstances.

An e-mail will be sent to you notifying you of any delivery that has arrived for you, which is stored in the receiving area in Latrobe 217. When picking up a package, sign and date the package log before taking your package. Outgoing shipments must be received in the Department Office before 2:00 p.m. As a convenience, personal items may be shipped and received through the Department Office, but the Department does not pay shipping fees for these. Please contact the administrative staff in Latrobe 223 with your questions.

OFFICE EQUIPMENT - Paper cutters, staplers, telephone books, and other items are available for general use. **These items must be kept in the Department Office.**

KITCHEN, including COFFEE and TEA SERVICE - A refrigerator and microwave oven are available to store and heat your meals. Please help keep the kitchen area clean. Coffee, tea, and hot chocolate are available at 50 cents per cup on the honor system. You may also pay $10.00 per month for a one-cup-a-day supply.

5.3. Additional Services and Resources

The University offers a variety of services. These are among some that cater to graduate students:

- **Registrar** - http://web.jhu.edu/registrar
- **Parking and Transportation Services** - http://ts.jhu.edu/
- **Center for Social Concern –** service opportunities and advocate for social change - http://csc.jhu.edu
- **Campus Ministries –** for all faiths and those seeking spiritual growth – http://web1.johnshopkins.edu/chaplain
- **Counseling Center –** whenever we need a little extra help from our friends - http://web.jhu.edu/counselingcenter
- **JHU Gazette –** the University's official news publication - http://hub.jhu.edu/gazette
- **Johns Hopkins Magazine** - http://hub.jhu.edu/magazine

6. Safety and Security

6.1. Laboratory Safety

Lab Safety is the responsibility of all who use, maintain, or visit the labs within the ME department. Laboratory researchers are responsible for working with the principal investigator to become familiar with the appropriate hazard information and safety policies before performing any work.

The JHU Department of Health, Safety and Environment maintains a website to ensure updated information on policies, issues, and concerns are available to all. Visit http://www.hopkinsmedicine.org/hse to view directives concerning Safety Responsibilities and Policies, Environmental Monitoring, Fire Safety, Chemical Safety, Laboratory Safety, and Radiation Safety.

Also, visit the Homewood Campus Laboratory Safety page at http://labsafety.jhu.edu/ for important information.

For each lab, a Principal Investigator (PI) is assigned. That person is responsible for the safe operation of the lab, training on all chemicals in the work area, the training of the persons on the equipment within the lab, and is a ready source to answer any questions on a specific lab with regards to its operation and all safety aspects. The PI's for each lab are listed on the entrance door to each lab.

6.2. Campus Security

While the Hopkins Security Department provides ample and appropriate security to the campus, they remind us that we must play our part. Please exercise common sense when entering and leaving your office, classrooms, and labs.

- When you leave your office, if you are the only one there, lock the doors even if you leave only for a minute! Thefts take only a few seconds and valuable equipment and your work can disappear instantly.
- Secure your computers, especially laptops! Take your laptops with you when you leave your office.
- Back up your work onto separate disks or systems in case something happens to computer via virus, equipment problems, or theft. The University provides free anti-virus software that can be downloaded from the website at http://it.jhu.edu/alerts/.
- Secure your laptop cases or any bag that might be mistaken for a computer bag.
- Lock your car and don't leave any items inside your car in plain sight. Secure them in your trunk or bring them with you.
- Secure your personal items such as your purse, wallet, books, equipment, and your coat or jacket.
- If you see someone suspicious in your lab or office, don't confront the individual, contact Security at 410-516-7777 right away. Your personal safety is most important.
- If you are uncomfortable walking through campus or to your car at night or otherwise are concerned for your safety, the Security department provides escort services to selected locations. Call 410-516-8700 to arrange for an escort.

7. Facilities

7.1. Libraries

The Milton S. Eisenhower Library offers a variety of online, research, and book lending services, which are outlined at http://library.jhu.edu.

The Library also purchases books and journals based on departmental requests. Student requests for books and journals should be discussed with their advisor who may communicate the request to the faculty member designated as the Library Liaison, currently Professor Jaafar El-Awady, who is located at Latrobe 123, and can be contacted at jelawady@jhu.edu or 410-516-6683.

7.2. WSE Manufacturing

The WSE Manufacturing student machine shop is located in the basement of the Wyman Park Building, and is open to students, faculty, and staff across the Johns Hopkins University. An orientation regarding shop safety, shop rules, and equipment operations is required to be allowed to work in the student machine shop.

To learn more about the WSE Manufacturing equipment and services available to students, please visit their website at http://engineering.jhu.edu/wse-research/wse-manufacturing/.

7.3. Computing

There are a cornucopia of computing facilities and services available to the Johns Hopkins community. The Information Technology website at http://it.jhu.edu offers an overview of the IT Organization, its projects and services, support for applications and general questions, and news about emerging technologies and strategic imperatives, as well as e-mail, web, and file sharing services.

7.3.1. JHU Information Technology

Information Technology at Johns Hopkins is the online resource for IT-related information. Their primary focus is to support the missions of the Johns Hopkins Institutions and provide technology solutions for faculty, staff, patients, and students in support of teaching, research, and patient care.

This Web site serves as a repository for all IT-related information at Johns Hopkins. You will find a lot of useful information within this site, including an overview of the IT Organization, its projects and services, support for applications and general questions, and news about emerging technologies and strategic imperatives.

7.3.2. WSE Information Technology

WSE IT is tasked with supporting the IT needs of the Whiting School of Engineering community. They are a component of the WSE Dean's office, and not a branch of IT@JH. Please visit their website at http://wseit.engineering.jhu.edu/ to learn how WSE IT can serve you.

7.3.3. Software Downloads

The university owns licenses of many software packages, many of which may be downloaded from the WSE IT website. Please visit http://wseit.engineering.jhu.edu/software-downloads/ to learn more.

7.3.4. Hopkins Academic Computer Lab – Krieger Hall

The Hopkins Academic Computer (HAC) lab, which offers a wide variety of Mac and Windows operating systems loaded with all kinds of software: Matlab, Mathematica, Microsoft Office, Adobe products and more are available in 160 Krieger Hall. Information is available at http://web1.johnshopkins.edu/classrooms/kriegerlab/.

8. Student Disability Services

The Office of Student Disability Services (SDS) assists full-time undergraduate and graduate students in the Krieger School of Arts and Sciences and the Whiting School of Engineering with disability concerns, in compliance with the provisions of the Americans with Disabilities Act of 1990 (ADA) and Section 504 of the Rehabilitation Act of 1973. SDS assists the University community in understanding the effects of disabilities and in eliminating the physical, technical, attitudinal and programmatic barriers that limit the range of opportunities for students with disabilities, as well as provides individuals with reasonable accommodations. The SDS maintains and protects the confidentiality of individual records as required by law.

For additional information and to access the services of the SDS office, please visit http://web.jhu.edu/disabilities/index.html, contact them at 410-516-4720 or studentdisabilityservices@jhu.edu, or visit their office in 385 Garland Hall.

9. Groups and Activities

9.1. Mechanical Engineering Graduate Student Association (MEGA)

MEGA is a social and advocacy organization for the graduate students of Mechanical Engineering. As a graduate student, you will be invited to various events throughout the year. For additional information, contact MEGA president Debjoy Mallick at jhumega@gmail.com.

9.2. University and Departmental Graduate Student Representation

Each year the graduate students elect a full-time Ph.D. student to serve as a departmental representative to the University's Graduate Representative Organization. The GRO, whose website is http://gro.jhu.edu, is an advocacy group for all graduate students. The GRO serves the student body as a liaison to the University's schools, administration, and dean's offices as well as hosts social activities and provides extensive information about life on campus and in and around Baltimore.

Each department sends a graduate student representative to serve in the GRO, and an announcement is made each year as to who will represent the department. You are welcome to forward to the representative your questions and concerns, which will be presented at GRO meetings.

9.3. American Society of Mechanical Engineers (ASME)

Visit the ASME Faculty Advisor, Dr. Steven Marra (marra@jhu.edu) in Latrobe 123 for information and application materials. Information about ASME can be found at http://www.asme.org/.

9.4. American Institute of Aeronautics and Astronomics (AIAA)

The Baltimore section of AIAA has an active branch on campus. Information is available at http://www.aiaa.org. For information, contact Dr. Kerri Phillips at Kerri.Phillips@jhuapl.edu.

9.5. Extracurricular Activities

As a department, Mechanical Engineering participates in University intramural athletics. Mechanical Engineering fields strong teams in softball, and periodically participates in basketball, volleyball, and other sports.

Periodically, students, staff, and faculty will host social events off-campus. You will be invited to these events as the department hears of them. If you want to host a social event, notify Mike Bernard, who will announce it to the Mechanical Engineering community and assist with arrangements.

Many groups and organizations throughout the University provide ample opportunities for social times and fun. Check out these websites for information:

9.5.1. Johns Hopkins University

- **Campus Life** - http://webapps.jhu.edu/jhuniverse/campus_life/
- **Student Life -** http://web.jhu.edu/studentlife
- **Arts and Culture** - http://web.jhu.edu/studentlife/homewood_arts/student_arts.html
- **Recreation Center –** grad students have free membership - http://web.jhu.edu/recreation.
- **Hopkins Athletics** - http://www.hopkinssports.com/

9.5.2. In the Baltimore Area

- **Baltimore Collegetown –** things to do and resources for college students - http://baltimorecollegetown.org/
- **Baltimore Area Convention and Visitors Association** - http://baltimore.org/
- **Baltimore Office of Promotion and the Arts** - http://www.bop.org/

10. Notice of Non-Discriminatory Policy

The Johns Hopkins University admits students of any race, color, sex, religion, national or ethnic origin, handicap or veteran status to all of the rights, privileges, programs, benefits and activities generally accorded or made available to students at the University. It does not discriminate on the basis of race, color, sex, religion, sexual orientation, national or ethnic origin, handicap or veteran status in any program or activity, including the administration of its educational policies, admission policies, scholarship and loan programs, and athletic and other University-administered

programs. Accordingly, the University does not take into consideration personal factors that are irrelevant to the program involved.

Questions regarding access to programs following Title VI, Title IX, and Section 504 should be referred to the Affirmative Action Officer, 205 Garland Hall, 410-516-8075.

11. Appendices

Please see the next page for appendices.

Department of Mechanical Engineering, Johns Hopkins University

Graduate Student Evaluation Form

Name: _____

Calendar Year: _____

Part 1 - to the student: This form is intended to summarize your accomplishments in the past year and indicate your plans for the coming year. Please complete, sign, and discuss this with your advisor. Your advisor will also sign it and see to it that it is placed in your student file. Continue on as many sheets as necessary.

Responsible Conduct of Research course completed? ☐ No ☐ Yes (When? _____)

- COURSES COMPLETED IN THE PAST 2 SEMESTERS:
- PLANNED COURSES FOR THE NEXT 2 SEMESTERS:
- TEACHING ASSISTANT REQUIREMENTS:
- PAPERS SUBMITTED OR PUBLISHED:
- CONFERENCE AND INTERNAL/INFORMAL PRESENTATIONS:
- MAJOR RESEARCH ACCOMPLISHMENTS:
- RESEARCH, ACADEMIC, AND OTHER GOALS IN THE COMING YEAR (advisor must agree):
- YOUR COMMENTS:
- ADVISOR'S COMMENTS:

I have reviewed this document with my advisor and I have seen his/her comments

Student signature _____ Date _____

Advisor signature _____ Date _____

Part 2 - to the advisor: This form is intended to guide a discussion with your student about their accomplishments, progress, and areas for improvement. This discussion is an opportunity to evaluate the student/advisor relationship and create a more effective research partnership. Below are several topics that should be covered in the discussion. Please think about these issues before meeting with the student. Space is provided for notes. **Both you and the student will sign this form.**

- **Research** (discuss as applicable: thesis topic, future publications, ability to conduct quality research, ability to think of and discuss new ideas, overall progress)
  Comments:

- **Professionalism** (discuss as applicable: conduct, presentation skills, writing skills, communication skills, teamwork)
  Comments:

- **Logistics** (discuss as applicable: graduation timeframe, future state of student funding, specific grant requirements, present funding, progress towards students post-graduate goals)
  Comments:

- **Educational Progress** (discuss as applicable: academic progress, progress towards DQE or GBO, teaching opportunities, TA opportunities)
  Comments:

- **Other** (discuss as applicable) – Unaddressed student or advisor concerns
  - Importance of research with respect to greater research community
  - Students impressions of their progress
  - _____
  - _____

Student signature _____ Date _____

Advisor signature _____ Date _____

Certificate of Departmental Approval
Master of Science in Engineering Degree (all-course option)
Department of Mechanical Engineering
(Matriculation before Fall 2014)

Name: _____
Hopkins ID#: _____
Advisor: _____
Graduation Date: _____

Requirement #1: Research and Laboratory Safety courses – only for masters students conducting research

- ☐ EN.500.401 Research Laboratory Safety Course Completion Date: _____

Plus either of these:

- ☐ Responsible Conduct of Research Course Completion Date: _____
- ☐ I conducted no research for the masters degree.

Requirement #2: Ten one-semester courses approved by faculty advisor

Course Number	Course Title	Math Course?*	Semester	Grade

Notes: A course is satisfactorily completed if a "P" grade or a grade from A+ to B- is obtained. Grades of C+ or lower are evidence of unsatisfactory academic performance. If necessary, one course with a C+, C, or C- final grade can be counted toward this degree.

- At least two courses should be in applied mathematics, numerical analysis or computational methods. (This requirement can be waived in writing by the advisor if sufficient preparation in these areas can be demonstrated.)
- EN.530.600 MSE Research can count as one of the ten courses. Otherwise, Independent Study, Graduate Research, or Special Studies courses are ineligible.
- Up to two courses may be chosen from the Engineering for Professionals Program.
- No more than four courses may be at the intermediate/advanced undergraduate (.300-.499) level. [NOTE: Computer Science (CS) uses the 400-level designation (600.4xx) for courses at the graduate level. A maximum of two 400-level CS courses may be used to fulfill the graduate-level course requirements for Ph.D. and M.S.E students. Those two courses will not count against the four-course limit for intermediate/advanced-undergraduate courses. This may result in listing up to six courses at the 400-level, though the 400-level CS courses are actually graduate-level courses.] Please consult the University's Course Catalog for additional information.

This is to certify that _____ has satisfied all of the academic requirements for the Master of Science in Engineering Degree in the Department of Mechanical Engineering.

_____ _____
Advisor's Signature Date

Certificate of Departmental Approval
Master of Science in Engineering Degree (all-course option)
Department of Mechanical Engineering
(Matriculation <u>after</u> Fall 2014)

Name: _____
Hopkins ID#: _____
Advisor: _____
Graduation Date: _____

Requirement #1: Research and Laboratory Safety courses – only for masters students conducting research

- ☐ EN.500.401 Research Laboratory Safety Course Completion Date: _____

Plus either of these:

- ☐ Responsible Conduct of Research Course Completion Date: _____
- ☐ I conducted no research for the masters degree.

Requirement #2: Ten one-semester courses approved by faculty advisor

Course Number	Course Title	Math Course?*	Semester	Grade

Notes: A course is satisfactorily completed if a grade from A+ to B- is obtained. Grades of C+ or lower are evidence of unsatisfactory academic performance. If necessary, one course with a C+, C, or C- final grade can be counted toward this degree. "P" grades are not accepted.

- * At least two courses should be in applied mathematics, numerical analysis or computational methods. (This requirement can be waived in writing by the advisor if sufficient preparation in these areas can be demonstrated.)
- These courses cannot include Independent Study, Graduate Research, MSE Research, or Special Studies courses.
- At least half of the courses must be EN.530.xxx Mechanical Engineering or EN.535.xxx Engineering for Professionals' Mechanical Engineering but no more than two courses may be chosen from the Engineering for Professionals Program.
- No more than four courses may be at the intermediate/advanced undergraduate (.300-.499) level. [NOTE: Computer Science (CS) uses the 400-level designation (600.4xx) for courses at the graduate level. A maximum of two 400-level CS courses may be used to fulfill the graduate-level course requirements for Ph.D. and M.S.E students. Those two courses will not count against the four-course limit for intermediate/advanced-undergraduate courses. This may result in listing up to six courses at the 400-level, though the 400-level CS courses are actually graduate-level courses.] Please consult the University's Course Catalog for additional information.
- Upon completion and submission of the essay / thesis, a copy of the library Commercial Binding Office receipt must be delivered to the Whiting School of Engineering's Academic Affairs office.

This is to certify that _____ has satisfied all of the academic requirements for the Master of Science in Engineering Degree in the Department of Mechanical Engineering.

_____ _____
Advisor's Signature Date

Certificate of Departmental Approval
Master of Science in Engineering Degree
Department of Mechanical Engineering
(Matriculation before Fall 2014)

Name: _____

Hopkins ID#: _____

Faculty Advisor: _____

Graduation Date: _____

Requirement #1: Research Conduct and Laboratory Safety courses

- ☐ Responsible Conduct of Research Course Completion Date: _____
- ☐ EN.500.401 Research Laboratory Safety Course Completion Date: _____

Requirement #2: Eight one-semester courses approved by faculty advisor

Course Number	Course Title	Math Course? *	Semester	Grade

Requirement #3: Completion of a research project and master's essay, approved by your faculty advisor.

Essay Title:

Notes: A course is satisfactorily completed if a "P" grade or a grade from A+ to B- is obtained. Grades of C+ or lower are evidence of unsatisfactory academic performance. If necessary, one course with a C+, C, or C- final grade can be counted toward this degree.

- * At least two courses should be in applied mathematics, numerical analysis or computational methods. (This requirement can be waived in writing by the advisor if sufficient preparation in these areas can be demonstrated.)
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_____ _____

Advisor's Signature Date

Certificate of Departmental Approval
Master of Science in Engineering Degree
Department of Mechanical Engineering
(Matriculation after Fall 2014)

Name: _____

Hopkins ID#: _____

Faculty Advisor: _____

Graduation Date: _____

Requirement #1: Research Conduct and Laboratory Safety courses

- ☐ Responsible Conduct of Research Course Completion Date: _____
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This is to certify that _____ has satisfied all of the academic requirements for the Master of Science in Engineering Degree in the Department of Mechanical Engineering.

_____ _____

Advisor's Signature Date