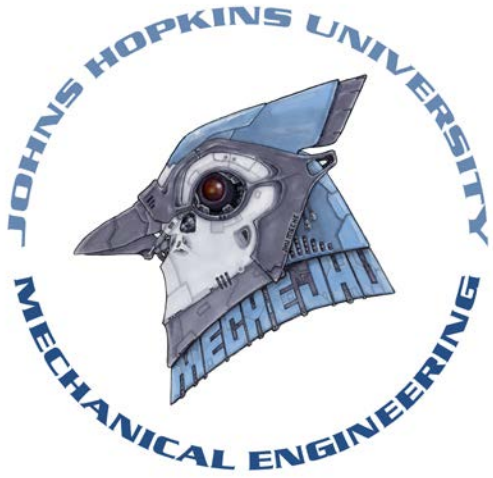
JOHNS HOPKINS
UNIVERSITY

Department of
Mechanical
Engineering

Graduate Student Advising Manual

2013-2014

Updated May 19, 2014



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1. Welcome!

Welcome to the Department of Mechanical Engineering! This manual is designed to serve as a guide for graduate students in the Department of Mechanical Engineering to work more effectively during the conduct of their research and to describe the basic academic requirements for both the MSE and Ph.D. degrees. 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, rules, and procedures, and offers suggestions regarding our program. Please address issues and questions not covered by this manual to your faculty advisor, Academic Program Administrator Mike Bernard, Academic Program Assistant Kevin Adams, Administrator Marty Devaney, or the Department Chair Louis Whitcomb. Please note that this document is not phrased to professional legal standards and that you will want to clarify any unclear issues with the department.

Graduate study is a joint enterprise involving faculty, fellow students, and instructors from other disciplines. Advanced degrees require advanced training through both coursework and individual faculty guidance as well as through innovative fundamental research. The results of this research should be disseminated through conference presentations, archival journals, and other appropriate publications. Our goal is to provide an environment that fosters a stimulating, rewarding, productive, and enjoyable intellectual enterprise.

2. Degree Programs

The full-time Master of Science in Engineering (M.S.E.) and the Doctor of Philosophy (Ph.D.) degree requirements, along with general information will be described here.

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 on the JHU Graduate Board's website at http://www.graduateboard.jhu.edu/residence.htm.

2.2. English Language Assessments for International Students

The English Language Program for International Teaching Assistants of the Language Teaching Center offers courses designed to make your teaching assistant as effective and enjoyable as possible. Placement testing is **required** for all new international graduate students, and will be conducted in the beginning of the Fall semester. The testing and courses that are recommended 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 the assessment is taken and all recommended remedial courses are successfully completed.

2.3. Required Introductory Courses and Tutorials

There are three introductory courses and tutorials that most or all graduate students must take.

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 (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 (360.625).
- Each Ph.D. student must complete take the in-person training course (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 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 and all Ph.D. students, whether working in a laboratory or not, should take the course 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 and research advisor will be one in the same as a full-time professor in the Department of Mechanical Engineering.

Occasionally, a Ph.D. or masters 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.

2.5. 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.

Table 1 – Anticipated Course Frequencies appears on the next page.

MECHANICAL ENGINEERING – COURSES – ANTICIPATED OFFERINGS					
Semester	**General**	**Robotics**	**Fluid Mechanics**	**Mechanics and Materials**	**Biomechanics**
Fall 2014	- 530.371 Applied Linear Algebra and Differential Equations - 530.430 / 530.630 Applied Finite Element Analysis - 530.661 Applied Mathematics for Engineers	- 530.420 Robot Sensors and Actuators - 530.424 / 530.624 Dynamics of Robots and Spacecraft - 530.603 Applied Optimal Control - 530.646 Robot Devices, Kinematics, Dynamics, and Control	- 530.467 Thermal Design Issues for Aerospace Systems - 530.621 Fluid Dynamics I - 530.726 Hydrodynamic Stability - 530.766 Numerical Methods	- 530.405 Mechanics of Advanced Engineering Structures - 530.605 Mechanics of Solids and Materials I - 530.656 Mechanisms of Deformation and Fracture - 530.790 AFEM Multi-Scale	- 530.440 Computational Mechanics of Biological Macromolecules - 530.446 Experimental Biomechanics - 580.451 Cell and Tissue Engineering Laboratory - 530.495 Microfabrication Laboratory - 530.610 Statistical Mechanics in Biological Systems
Spring 2015 (anticipated)		- 530.421 Mechatronics - 530.470 Space Vehicle Dynamics and Control - 530.647 Adaptive Systems - 530.678 Nonlinear Control and Planning in Robotics	- 530.444 Computer-Aided Fluids and Heat Transfer - 530.464/664 Energy Systems Analysis - 530.622 Fluid Dynamics II - 530.762 Advanced Math Methods - 530.767 Computational Fluid Dynamics	- 530.405 Mechanics of Solids and Structures - 530.606 Mechanics of Solids and Materials II - 530.658 Thermally Activated Processes in Solids - 530.730 Finite Element Methods	- 530.410 Biomechanics of the Cell - 530.441 Intro to Biophotonics - 530.452 Cell and Tissue Engineering Laboratory - 530.672 Biosensing and BioMEMS

MECHANICAL ENGINEERING – COURSES – ANTICIPATED OFFERINGS					
Semester	**General**	**Robotics**	**Fluid Mechanics**	**Mechanics and Materials**	**Biomechanics**
Fall 2015 (anticipated)	- 530.371 Applied Linear Algebra and Differential Equations - 530.430 / 530.630 Applied Finite Element Analysis - 530.661 Applied Mathematics for Engineers	- 530.420 Robot Sensors and Actuators - 530.603 Applied Optimal Control - 530.646 Robot Devices, Kinematics, Dynamics, and Control - 530.653 Advanced Systems Modeling	- 530.425 Mechanics of Flight - 530.621 Fluid Dynamics I - 530.625 Turbulence - 530.632 Convection - 530.637 Energy and the Environment - 530.767 Computational Fluid Dynamics	- 530.418 Aerospace Structures and Materials - 530.605 Mechanics of Solids and Materials I - 530.642 Plasticity - 530.732 Fracture of Materials - 530.772 Nonlinear Finite Element Methods	- 530.445 Introduction to Biomechanics - 580.451 Cell and Tissue Engineering Laboratory - 530.485 Physics and Feedback in Living Systems - 530.495 Microfabrication Laboratory
Spring 2016 (anticipated)		- 530.421 Mechatronics - 530.649 Adaptive Systems and System Identification - 530.654 Advanced Systems Modeling II - 530.676 Locomotion in Mechanical and Biological Systems - 530.678 Nonlinear Control and Planning in Robotics - 530.707 Robot System Programming	- 530.328 Fluid Mechanics II - 530.426 Biofluid Mechanics - 530.432 Jet and Rocket Propulsion - 530.622 Fluid Dynamics II - 530.762 Advanced Math Methods	- 530.381 Engineering Design Process - 530.448 Biosolid Mechanics - 530.606 Mechanics of Solids and Materials II - 530.730 Finite Element Methods - 530.748 Stress Waves, Impacts, and Shockwaves	- 530.410 Biomechanics of the Cell - 530.426 Biofluid Mechanics - 530.441 Intro to Biophotonics - 530.448 Biosolid Mechanics - 530.452 Cell and Tissue Engineering Laboratory - 530.628 Nonlinear Dynamics in Mechanics and Biology - 530.672 Biosensing and BioMEMS

2.6. M.S.E. Degree

The M.S.E. degree may be a final degree or it may be earned *en route* to the Ph.D. 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) No more than two courses may be chosen from the part-time Engineering for Professionals program.

b) No more than four courses may be at the intermediate/advanced undergraduate (xxx.300 – xxx.499) level. [NOTE: Computer Science (CS) uses the 400-level designation (600.4xx) for courses at the beginning 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.]

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

b) An M.S.E. essay (the official title of masters theses at Johns Hopkins) acceptable to your advisor and one other reader.

According to the Graduate Board's Procedures for Administration of Approved Policies for the Award of Advanced Degrees, "Thesis readers are selected and appointed by the chair or appropriate faculty of the sponsoring department or committee. Any duly appointed member of a department or committee holding the rank of assistant professor or higher (excluding lecturers) is eligible for selection as a referee without prior approval. The Graduate Board Office must approve readers from outside the University, or from any non-Ph.D. sponsoring department, laboratory or institute within the University."

2.6.1. Only One C-type Grade Can Count Toward the MSE

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

2.6.2. Double-Counting Courses

The Mechanical Engineering department double-counts courses, using Whiting School of Engineering policy. See http://eng.jhu.edu/wse/page/graduate-double-counting/ for information.

Coursework applied to a bachelor's degree:
Students either in a WSE concurrent (bachelor's/master's) program or seeking a WSE master's degree after having earned a WSE or Krieger School of Arts and Sciences bachelor's degree may double-count two courses (400-level or higher) to both programs with the permission of the master's faculty advisor. WSE master's degree candidates may not double-count courses applied to a bachelor's degree earned at a different institution. Individual graduate programs reserve the right to enforce stricter policies.

Coursework not applied to a bachelor's degree:
For students who are either in a WSE concurrent bachelor's/master's degree program or have already earned a Whiting School of Engineering or Krieger School of Arts and Sciences bachelor's degree and are seeking a WSE master's degree, any graduate-level coursework (as defined by the WSE graduate program) not applied to the undergraduate degree may be applied to the graduate degree, regardless of when that course was taken (i.e., before or after the undergraduate degree has been conferred) with the permission of the master's faculty advisor.

2.6.3. Certification of Advanced Degree

Students who have completed the requirements for the M.S.E. degree should apply for graduation on their ISIS record and obtain the "Certification for Advanced Degrees" form from Academic Program Administrator Mike Bernard.

Ph.D. students earning the M.S.E. degree must apply for graduation using a hard-copy application, as the ISIS graduation application option is not currently available. Those forms are available on the master's certification page at http://me.jhu.edu/masterscertification.html or at the Registrar's office.

2.6.4. 4th Semester Tuition for All-Course Programs

Students earning the masters degree using the "all-course" option typically finish the degree requirements in three semesters, but occasionally may need a fourth semester. To help reduce costs in the last semester, the department will allow students to pay tuition on a per-course basis which, according to University policy, places them in a part-time status. Students must meet the following conditions to qualify:

- The student needs only one or two courses to complete the degree.
- The final course(s) will be taken in the fourth semester.
- International students must first obtain approval from the OISSS, as this may affect their visa statuses.

Per University policy, part-time students are ineligible to work as a student worker, including Teaching Assistant, and are limited to taking two courses in a semester.

2.6.5. Degree Deadlines

The masters degree completion schedule and deadlines are available at http://eng.jhu.edu/wse/page/masters-schedule/. Be sure to meet the deadlines when completing your degree and related applications to graduate.

2.6.6. Printing of Essays

Essay printing is not allowed within the department as the copiers are meant for much smaller copying jobs.

The Graduate Representative Organization offers printing of essays at a discounted rate compared to commercial printers. Visit http://gro.jhu.edu/thesisprinting/index.html for information.

Beginning September 1, 2013, dissertations will be submitted only by electronic media. Hardbound books will not be printed on campus, but information will be provided on where dissertations can be printed and bound. For information, contact David Reynolds, the Library ETC Coordinator at 410-516-7720 or dissertations@jhu.edu.

2.6.7. Submission of Essays

For students writing an "essay," the official title of master's theses at Johns Hopkins, the completed essay must be delivered to the Milton S. Eisenhower library for binding. The library's Commercial Binding Office will bind multiple copies. Students are required to submit one copy for the Mechanical Engineering department library. Upon submission of the essay for binding, students will be given a receipt, which must be delivered to the Whiting School's Academic Affairs office in 103 Shaffer Hall.

2.6.8. Degree Completion Time Limit

The Whiting School of Engineering states that every student 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.

2.7. Academic Performance Requirements

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.

Masters Academic Performance Notification: 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.

Ph.D. Academic Performance Notification: A student earning one C+, C, or C- grade will receive notification, with a copy to his or her advisor, of academic performance concerns and an explanation that a second C+, C, or C- or the student's first D or F grade will result in termination from the program. A student receiving a termination notification can appeal to the Graduate Program chair by the official date by which Incomplete grades must be resolved for that semester, as established by the Registrar's Office. The chair, who may consult with the student and the student's advisor, is required to formulate a final written decision within two weeks after that date.

2.8. Non-Residency Status

Masters students who are writing a thesis and Ph.D. students are eligible for non-residency status when all degree requirements except the thesis or dissertation are complete.

ADVANTAGES: 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.

DISADVANTAGES: Non-resident students cannot enroll for courses and would lose the Whiting School's financial support for health insurance, though they would not be required to enroll for health insurance. The department could choose to cover health insurance charges, but that is not guaranteed.

Students will have to apply for non-resident status each semester and would have to provide a letter explaining their progress toward the degree's completion.

Resources:

- Graduate Board "Forms" Page: http://grad.jhu.edu/academics/gradboard/forms/
- Non-Resident Application: http://www.grad.jhu.edu/downloads/AppNR1314%20-%20fillable.pdf
- Non-Resident Annual Report: http://www.grad.jhu.edu/downloads/NRAR1314%20-%20fillable.pdf
- 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)

2.9. 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, which is discussed later in this manual.

This is the process to switch programs:

- 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 Administrator or designee will enter an online application to the University graduate application system.
- The student will receive and accept admission to the Ph.D. program.
- The Graduate Admissions office 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.

Please contact Academic Program Administrator Mike Bernard with questions.

2.10. Ph.D. Degree

The Ph.D. degree certifies that the holder has demonstrated the ability to conduct independent research and develop new knowledge. The requirements for a Ph.D. in Mechanical Engineering are as follows:

Fulfill the University-wide requirements by:

a) Completing a minimum of two consecutive semesters as a full-time resident graduate student,

b) Passing the Graduate Board Oral examination (GBO), and

c) Submitting and defending a dissertation approved by at least three referees appointed by the Mechanical Engineering Department faculty.

In addition to the University-wide requirements, students must:

a) Pass the Departmental Qualifying Examination (DQE) before the start of their fifth semester as a doctoral candidate. This examination is preliminary to the GBO and its primary purpose is to evaluate the candidate's suitability for continuing study.

b) Act as Teaching Assistant to at least two Mechanical Engineering courses.

c) For each semester that a student maintains full-time status (that is, not change to non-resident status)

   i. Register and pass 530.801 (Fall) and 530.802 (Spring) Graduate Research.

   ii. Register and pass 530.803 (Fall) and 530.804 (Spring) Mechanical Engineering Seminar by attending the required number of presentations.

d) Earn an appropriate grade for all classes taken (see Section 2.6).

2.11. Ph.D. Departmental Qualifying Examination

The completion of a doctoral degree at a major research university requires a high level of academic sophistication in the candidate's field, as well as the ability to apply this advanced background in the creation of new knowledge. The Departmental Qualifying Examination (DQE) is an approximately one-hour oral examination in which students are tested in their principal research areas: fluid mechanics, mechanics and materials, biomechanics, or robotics, and also in applied mathematics.

The examination is given in late January or by special arrangement with the Graduate Program Committee Chair, who in 2013-14 is Professor Andrea Prosperetti.

The possible outcomes of the DQE are "Unconditional" pass, "Conditional" pass, "Reexamination," and "Failure."

No additional action is necessary when an unconditional pass is earned. A conditional pass becomes an unconditional pass when conditions specified by the committee (e.g., taking one or more courses or others) are fulfilled by a specified deadline. A reexamination asks the student to retake a portion of or the whole exam.

A student who receives a Failure is allowed to retake the entire exam within six months of the initial exam date. Generally, a Failure in the DQE retake is grounds for automatic dismissal from the Ph.D. program.

2.11.1. Fluid Mechanics and Heat Transfer

Students are presumed to be prepared for the Departmental Qualifying Examination on completion of courses 530.621 and 530.622 Fluid Dynamics I & II and 530.632 Convection, as well as possessing an undergraduate-level knowledge of thermodynamics, heat and mass transfer, fluid mechanics and the application of fundamental concepts to technological problems.

In mathematics, students are required to have taken, or have the knowledge equivalent to 530/570.661 Applied Mathematics for Engineering and 530.762 Advanced Mathematical Methods for Engineers.

2.11.2. Mechanics and Materials

Students in this area typically follow either a mechanics-intensive track or a materials-intensive track.

> Mechanics-intensive Track: Students are presumed to be prepared on completion of courses 530.605 Mechanics of Solids and Materials, and appropriate undergraduate courses in statics, dynamics, mechanics of materials, and vibrations. Depending on their research focus, students will also be examined on 530.730 Finite Element Analysis, 530.612 Computational Solid Mechanics, or 510.604 Mechanical Properties of Materials.
>
> In mathematics, students are required to have taken, or have the knowledge equivalent to 530/570.661 Applied Mathematics for Engineering and 530.762 Advanced Mathematical Methods for Engineers.
>
> Materials-intensive Track: Students are presumed to be prepared on completion of courses 530.605 Mechanics of Solids and Materials, 510.601 Structure of Materials, 510.602 Thermodynamics and Kinetics of Materials, 510.604 Mechanical Properties of Materials, and appropriate undergraduate courses in statics, materials selection, and mechanics of materials.

In mathematics, students are presumed to be prepared on completion of 530/570.661 Applied Mathematics for Engineering and 530.762 Advanced Mathematical Methods for Engineers or equivalent.

2.11.3. Robotics

Students are presumed to be prepared on completion of 530.646 Introduction to Robotics, and at least three of the following courses as approved by the student's advisor:

- 530.420 Robot Sensors and Actuators
- 530.421 Mechatronics
- 530.424 Dynamics of Robots and Spacecraft
- 530.616/580.616/520.601 Introduction to Linear Systems
- 530.647 Adaptive Systems
- 530.676 Locomotion in Mechanical and Biological Systems
- 600.435 Artificial Intelligence
- 600.436 Algorithms for Sensor-Based Robotics
- 600.461 Computer Vision
- 525.466 Linear System Theory I

Students should have proficiency in calculus, linear algebra, differential equations, linear systems, physics, statics, dynamical systems, vibrations, and strength of materials as appropriate for the conduct of their research.

In mathematics, students are required to use ordinary differential equations, linear algebra, and multidimensional calculus, as well as to perform frequency domain analysis. It is assumed that incoming students have knowledge equivalent to at least that of undergraduate third-year courses and will have taken two graduate-level mathematically intensive courses as agreed by the student's advisor.

Each student should select a course of study consistent with their research and approved by their advisor.

2.11.4. Biomechanics

Students in the biomechanics concentration are expected to take the departmental qualifying exam (DQE) after three semesters of graduate study. The student should demonstrate good knowledge in the areas of engineering mathematics, numerical/ computational methods, mechanics and biological sciences. To fulfill these requirements, the student must successfully complete at least six courses (at least two from the mathematics/numerical methods area and at least four from mechanics/ biosciences area), or show knowledge equivalent to these courses:

1) *Engineering Mathematics*

   550.291 Linear Algebra and Differential Equations
   550.391 Dynamical Systems
   550.426 Introduction to Stochastic Processes
   530/570.661 Applied Math for Engineering
   530.762 Advanced Mathematical Methods for Engineers

2) *Numerical and Computational Methods*

   530.612 Computational Solid Mechanics
   530.730 Finite Elements
   530.766 Numerical Methods

3) *Mechanics*

530.605 Mechanics of Solids and Structures
530.621/530.622 Fluid Mechanics I and II
530.671 Statistical Mechanics in Biological Systems
530.672 BioMEMS and Biosensing
530.757 Nanomechanics
530.771 Orientational Phenomena

4) *Biological Science*

020.306 Cell Biology
020.380 Eukaryotic Molecular Biology
530.410 Biomechanics of the Cell and Organisms
580.687/580.688 Foundations of Computational Biology and Bioinformatics

This is not an exhaustive list. Other courses offered at the Homewood Campus, the Medical School, and the School of Public Health may be approved by your advisor. NOTE: Some of these courses have prerequisites or require the permission of the instructor to take the course. Please consult the University's *Undergraduate and Graduate Programs* course catalog for further information.

2.12. Ph.D. Graduate Board Oral Examination

The Graduate Board Oral (GBO) examination is the University-wide "quality-control" check on our program. For all departments, the GBO exam has the following basic structure:

> The two-hour examination is conducted by five faculty members: two Mechanical Engineering professors and three from outside the Department, who are selected by the Department Chair in consultation with the student's advisor. One departmental alternate and one outside alternate are also required. The examination is chaired by the most senior of these outside members, usually a Professor. The examination chair has the right to set the scope of the exam.

The Mechanical Engineering Department frequently adheres to the following:

a) Students normally take the GBO examination about a year after completion of their Departmental Qualifying Examination, usually during or after their sixth semester.

b) Although there are no formal course requirements, students are presumed to be prepared for the GBO by studies equal to six graduate level (xxx.600-xxx.799) courses in their field of specialization and six advanced (xxx.300-xxx.799) courses in related fields.

c) The members of the GBO examining committee are nominated by the student's advisor and approved by the Department Chair.

d) While it is usual for students to provide examiners with a brief synopsis of their research project two weeks before the examination, they are not usually asked to make a presentation on their research. The examination most frequently begins with questions from members of the department on any subject of their choosing.

Students take this examination very seriously and use it as an opportunity to synthesize the knowledge gained in the different courses they have taken. Each examination is different, but students are required to display significant depth in the areas related to their research and to demonstrate the ability to think and apply their advanced knowledge. Fundamental concepts, from sophomore-level mechanics to rigorous expressions of physical phenomena are all within the scope of the exam. General scaling laws, dimensional analysis, and basic physical principles (for example, conservation laws) are tools on which students may be asked to draw.

Candidates may be required to give formal definitions for concepts and terms germane to their research and to give numerical values of physical parameters with which they work. The usefulness and potential application of a student's research or field of study may also be examined.

Students preparing to take the GBO must contact Academic Program Assistant Kevin Adams to make arrangements at least eight weeks prior to the intended exam date. The advisor and Department Chair will then select examiners and alternates. Eight weeks' notice will allow time to confirm availability of the proposed examiners and notify the Graduate Board by their notification deadlines.

2.13. Ph.D. Dissertation Defense

The final and principal requirement for the doctorate is a piece of original research worthy of publication. Candidates must write a dissertation describing their work in detail and pass a final oral examination which is essentially a defense of the dissertation.

Students should schedule their defense with the Academic Program Administrator and make arrangements necessary for the successful completion of their program.

Dissertation defense preparation steps are available at http://www.me.jhu.edu/dissertationdefense.html.

International Students must visit the International Office

All international students must visit the International Office at least two months in advance of the defense date to ensure that their visa status and application for their EAD card and Optional Practical Training is in place.

Dissertation Readers

The Graduate Board requires that your readers be your advisor and another JHU professor. The Mechanical Engineering department requires a third reader, who can be inside or outside of JHU (with prior approval of the department Chair).

Printing Dissertations

Dissertation printing is not allowed within the department as the copiers are meant for much smaller copying jobs.

The Graduate Representative Organization offers printing of dissertations at a discounted rate compared to commercial printers. Visit http://gro.jhu.edu/thesisprinting/index.html for information.

Beginning September 1, 2013, dissertations will be submitted only by electronic media. The Mechanical Engineering department will order three copies – one for the student, one for the advisor, and one for the department library – free of charge. The Academic Program Administrator will arrange to order the copies upon the dissertation's submission.

Dissertation Submission Receipt Notification Requirement

Upon delivery of dissertations for to the MSE Library's Commercial Binding Office (CBO) for binding, the Graduate Board will require that students send an e-mail to homewoodgradboard@jhu.edu that includes the title of the dissertation typed in the body, along with an attachment of a scanned copy of the CBO submission receipt.

2.14. Academic Deadlines

Students preparing to complete a degree program in a given semester should see Mike Bernard to ensure that all necessary forms and requirements have been completed and submitted *prior* to the academic deadlines for the semester. The deadlines to submit all certification material are usually:

- Fall: late-October
- Winter: mid- to late-January
- Spring: late-March (Ph.D.), early-May (M.S.E.)
- Summer: late-July

Students who have not completed their requirements by the first day of classes must register for the current semester. Those who complete their requirements prior to the October deadline will receive a full tuition refund for the fall semester, including any non-resident status fees. Tuition paid from departmental funds or research grants will also be refunded.

Those who have completed their requirements in the summer or fall will receive an interim certificate from the registrar's office indicating that all requirements have been met, and notation will be made on their transcript. Diplomas are awarded once a year, at the May Commencement. Additional information is available at http://www.grad.jhu.edu/academics/gradboard/deadlines.php.

3. Miscellaneous Academic Information

3.1. Graduate Student Annual Reviews

The Johns Hopkins University and Whiting School of Engineering require that once per academic year all full-time Homewood graduate programs carry out a written review of all doctoral and master's students conducting thesis research. The review process includes the opportunity for a student to offer a self-evaluation to discuss with his or her advisor.

The Mechanical Engineering Graduate Program Committee has the support of the faculty and with the Mechanical Engineering Graduate Student Association (MEGA) in conducting the review. The department recognizes that while the majority of students have regular and meaningful meetings with their advisors, all parties agree that having a formal annual review is good practice and a worthwhile time investment.

The Graduate Program Committee and MEGA have created a review form, which is in the back of this manual and at http://www.me.jhu.edu/gradprog.html.

Before the first day of class in the Spring semester, usually the fourth Monday in January, all doctoral students and master's students conducting thesis research must complete this form and discuss it with their advisor. The student and advisor will both sign the review, which will be given to our Academic Program Administrator, Mike Bernard for filing.

The greatest benefit of this review will no doubt come from the student–advisor meetings, but the completed reviews are also structured to provide the department with a meaningful measure of the progress that our students are making.

3.2. Departmental Seminars

Part of the 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.

SEMINAR REGISTRATION REQUIRED EVERY SEMESTER for Ph.D. STUDENTS!

Ph.D. students are required (and M.S.E. students are encouraged) to register for and attend the 530.803 (Fall) and 530.804 (Spring) Mechanical Engineering Departmental Seminars, which occur every Thursday at 3:00p.m.

Registered students must attend a minimum of 8 seminars of the official Mechanical Engineering series, plus four other seminars, for a total of 12 per semester.

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. These seminars are beneficial, as it is common for GBO examiners to include questions addressed in such seminars.

3.3. Informal Student Seminars – Registration Required

In preparation for their thesis defense, students are required to present their work at informal seminars within the Department. Your advisor will explain the scope and expectations of your role as spectator and presenter in these presentations.

3.3.1. Fluids Seminars

The Fluids group holds student presentations on Fridays. All Fluids graduate students must register for this seminar using course numbers 530.807 in the Fall semester and 530.808 in the Spring semester.

3.3.2. Mechanics and Materials Seminars

The Mechanics and Solid Materials Student Seminar Series group meets Fridays at 12:00 noon. All Mechanics and Materials graduate students must register for this seminar using course numbers 500.809 in the Fall semester and 500.810 in the Spring semester.

3.3.3. Robotics Seminars

The Robotics group meets regularly at the discretion of the group. All Robotics graduate students must register for this seminar using course number 500.745 each semester.

As information is received, schedules will be sent to you in advance. Students are expected to attend these seminars, which provide an informal opportunity to learn about the ongoing research work of their colleagues.

3.4. Professional Communication Program

Classes are offered during the Fall semester for graduate students through the Professional Communication Program in the Whiting School of Engineering.

- 661.150 ORAL PRESENTATIONS is designed to teach students how to give effective oral presentations.
- 661.610 RESEARCH WRITING is designed for students working on dissertations, theses, or a scientific/research publication. This class also contains an oral presentations component.

Additional courses will be offered in the Spring semester. The Whiting School of Engineering's Center for Leadership Education staff can answer questions at cle@jhu.edu or 410-516-8205.

3.5. Master of Science in Engineering Management

The Whiting School of Engineering offers a Master of Science degree in Engineering Management (MSEM). This program bridges the gap between technology and business

by equipping students with the technical expertise and leadership skills they need to advance their career in the fast-paced world of technology.

Program Requirements

Just ten courses are required to complete this advanced degree:

- Five advanced courses to fulfill the management concentration, including one capstone course that integrates and applies knowledge gained throughout the program.
- Five advanced courses in a declared technical area of engineering or applied science.

Technical Specializations

- Biomaterials
- Communications Science
- Computer Science
- Fluid Mechanics
- Materials Science and Engineering
- Mechanical Engineering
- Mechanics and Materials
- Nano-Biotechnology
- Nanomaterials and Nanotechnology
- Operations Research
- Probability and Statistics
- Smart Product and Device Design
- Environmental Systems Analysis, Economics and Public Policy

Consult the MSEM website at http://engineering.jhu.edu/msem/index.html for additional course and application information.

3.6. 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.

Please consider the following, which had previously been published on the Whiting School of Engineering Academic Affairs website: "An ethical campus fosters a positive sense of community and trust, while unethical actions and attitudes breed suspicion, cynicism, and negativity. Johns Hopkins University strives to be a community in which honesty and respect are valued and upheld, and in which all members of the community uphold the highest degree of ethical conduct. Academic ethics is the responsibility of every student, faculty member, and staff person at Johns Hopkins

University. You must take the time to learn about what is ethical and what is not - ignorance of ethical rules is not an excuse for cheating. If you see a violation take place, it is your responsibility to report it.

"Every class you take at Hopkins should address ethics, and some activities that are allowed in one class may not be allowed in another class. If you are not sure if an action is ethical for a particular class, e.g. working in a group on homework, read the syllabus carefully and ask your professor."

Examples of Academic Misconduct:

- Cheating
- Plagiarism
- Reusing Assignments
- Improper Use of the Internet
- Improper Use of Electronic Devices
- Unauthorized Collaboration
- Alteration of Graded Assignments
- Forgery and Falsification
- Lying
- Facilitating Academic Dishonesty
- Unfair Competition

Information about academic policies of the Whiting School of Engineering can be found at http://eng.jhu.edu/wse/page/policies-and-procedures-phd. Please read them.

4. Financial Aid

There are four sources of financial aid available to Mechanical Engineering students. First, Dean's fellowships to eligible students cover 80% of a Ph.D. student's tuition. The second is provided by Teaching Assistant hourly positions. Next are Research Assistantships for students working on funded research projects. The fourth is through Departmental fellowships.

Note that for M.S.E. students, financial aid is less common, though limited opportunities for partial tuition fellowships and salaried positions may become available from time to time.

4.1. Tuition Fellowships

At the Dean's discretion, tuition fellowships may be awarded to full-time students who are supported by the Department through either faculty research projects or fellowships. Ph.D. candidates may be eligible for 80% tuition fellowships.

4.2. Teaching Assistant – Hourly Positions

To assist in the teaching function of the Department, Teaching Assistant opportunities are provided to students who grade 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.

Ph.D. students are required to act as a Teaching Assistant for two Mechanical Engineering courses.

4.3. Research Assistantships

Students working directly on funded research projects are paid by the faculty member's projects conducting that research. In the 2013-14 academic year Research Assistants are typically paid a salary of $1,135.42 semi-monthly at an annual full-time rate of $27,250. This rate may vary depending on the grant or funding agency.

Continuation of a Research Assistantship is determined by a student's performance and the availability of research funding. This support allows students to progress towards completion of their degrees, but also requires the completion of specific research accomplishments.

There are a few basic rules regarding the holding of a Research Assistantship.

a) At least once weekly meetings with the student and faculty advisor are the norm, but vary from advisor to advisor.

b) Both the Intersession in January and the summer, June through August are particularly important periods for research progress. Students are expected to make significant effort during these periods.

c) Students on 12-month Research Assistantship salaries should discuss any planned absences with their advisors.

4.4. Fellowships

Mechanical Engineering offers the Departmental Fellowship, provided to an outstanding first-year student to allow the opportunity to find an appropriate advisor and embark on research. The current fellowship award includes full tuition remission, health insurance, matriculation fee, and a stipend of $1,135.42 semi-monthly at an annual full-time rate of $27,250.

The Whiting School of Engineering maintains a website on additional external fellowships at http://eng.jhu.edu/wse/page/external-fellowships where a student can apply for additional financial aid.

4.5. Graduate Student Discretionary Account

Departmental Fellows and sometimes, a few Research Assistants will be offered a $2,000 Discretionary Account as part of their admission offer. Students can use the account for educational uses like equipment, supplies, events, and conferences. Funds must be used in the student's first academic year.

ACCOUNT NUMBERS
Unique account numbers will be assigned to each student.

PRE-APPROVAL NEEDED BEFORE PURCHASE
Advisors must pre-approve purchases in writing per the usual protocol in Section 6.2 of this manual.

Students are strongly encouraged to order their items using their unique account number with the department's Accounting Specialist, Nicole Wilson, in Latrobe 223.

USE TAX EXEMPT CARDS
Students can purchase items directly, as needed. Present Tax Exempt cards when purchasing items subject to sales tax, as this tax will not be reimbursed. See Section 6.4 on Tax Exempt Certificates in this manual for information.

On a case-by-case basis, the student may obtain approval from the advisor and appropriate Mechanical Engineering staff for providing funds before a purchase.

HOW TO REQUEST REIMBURSEMENT
Please submit itemized receipts for purchases to the department's Accounting Specialist. The Academic Program Administrator will track purchases and notify students when his or her account balance is below $200. The purchases will be charged to the student's unique account number and reimbursed usually within 10-15 business days.

DEADLINE FOR ACCOUNT USE
Students matriculating in the fall must use the funds by May 31. Those matriculating in the spring must use funds by January 31.

DISTRIBUTION OF UNUSED FUNDS
Any unused funds will be reimbursed shortly after the deadline for account use. Distribution of unused funds is considered income and is subject to income tax based on U.S. tax law.

4.6. Other Financial Aid

The Office of Student Financial Services has other financial aid sources available, even to those who current have full financial support, including research assistantships and some fellowships. Any enrolled or accepted graduate student who is a U.S. citizen, U.S. permanent resident, or eligible non-citizen may apply for federal and state financial aid. Sources of aid, eligibility requirements, applications, and other information are available at http://www.jhu.edu/finaid/grads.html.

4.7. Student Employment

The Student Employment Services office offers opportunities for employment for many positions on the campus. They will help you determine your work eligibility. Should you wish to obtain additional employment, please speak with your advisor so you will be able to fulfill the obligations of your education and research. The Student Employment Services office is located in the basement of Garland Hall, and their website is located at http://www.jhu.edu/stujob/.

5. Administration

5.1. Department Offices

The Department Administrative Office is located in Latrobe 223. Our Senior Administrative Manager Marty Devaney and staff: Academic Program Administrator

Mike Bernard; Academic Program Assistant Kevin Adams; Senior Research Service Analyst Lorrie Dodd; Senior Administrative Coordinator Deana Santoni; and Accounting Specialist Nicole Wilson are available to assist you.

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.

The Academic Program Administrator manages, with the Academic Program Assistant's help, the graduate application process, administration of the graduate and undergraduate programs, and a host of other academic duties. The Senior Administrative Coordinator assists the faculty and the Department Chair. Although the staff does not provide secretarial services to students, they are willing to answer questions and to provide suggestions on how such tasks might be best accomplished.

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 photocopy machine 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 next to the Student Lounge in Latrobe 318. Mail is ordinarily picked up and distributed daily. It is important that you 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. If there are questions, concerns, or special needs regarding shipping of your packages, please contact Accounting Specialist Nicole Wilson at 410-516-6782 or nwilson9@jhu.edu.

PRINTER PAPER is available from the department office for the printers in your laboratories. Please see an office staff member in Latrobe 223 to obtain paper. You will sign a tracking sheet. You may also order a case of paper from our Accounting Specialist.

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

OFFICE SUPPLIES - As a convenience, generic office supplies are made available to students. These supplies are limited and must be requested from the Department Office. Please inform the staff when you see that an item is out or running low.

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.

6. Purchasing and Travel Reimbursements

6.1. Account Numbers are Necessary for Purchases

Account or "budget" numbers for research project expenditures are extremely important. Your advisor has a series of account numbers and will supply you with the account number to use for any purchases. Orders cannot be processed without this number, which is either a 9-digit "Internal Order" number for sponsored projects or a 10-digit "Cost Center" for non-sponsored accounts.

6.2. Ordering Equipment, Supplies, and Services

Orders for the purchase and acquisition of supplies, equipment and materials must be arranged with the Accounting Specialist. Orders must be received by 3:00 p.m. to allow the possibility of same-day ordering. Orders received after 3:00 p.m., in most cases, will be ordered the next business day.

Send your orders with the following information:

- The vendor's name and contact information – include when possible the postal address, telephone number, e-mail address, and the vendor's website address.
- Description of the item
- Part number
- Price or valid vendor quote

- The complete Internal Order or Cost Center number to be charged.
- Approval from your advisor or principal investigator, as necessary.
- Tag number for any "equipment" (see sections 6.2.1 and 6.2.2).

Do not send a "shopping cart" link or other link to the product, because the information on the link may change between the time you send the request and the time of the order.

6.2.1. Equipment Items

Equipment is defined as an article of non-expendable, tangible property having a useful life of more than one year and an acquisition cost of $5,000 or more per unit. To order such equipment, three quotes from three vendors are necessary, or a sole source justification letter explaining why a specific vendor must supply the item must be provided.

6.2.2. Tag Numbers

The JHU Office of Cost Analysis is responsible for identifying, recording, and tagging equipment. Whenever possible, equipment items costing $5,000 or more are tagged with a University property tag, using a tag which contains a bar-coded property identification number. Property tags are affixed to equipment by Cost Analysis staff in a standard, visible location on the equipment.

Never remove the Tag Number from your equipment! The bar-coded Tag Number labels are self-destructive. When removed, bar-coded labels leave a checkered design imprinted on the equipment and the tag cannot be reapplied.

6.2.3. Component Parts

Component parts are those that will be used to fabricate or build a piece of equipment. Parts to be used in the fabrication of an item of equipment are defined as "equipment" when the total cost is more than $5,000.

Installation costs and freight charges are considered a part of the cost of equipment. They should be included in the total cost and charged to an equipment object code if the total cost is more than $5,000.

6.2.4. Supply Items

Supply items are defined as articles which cost less than $5,000 and/or have a useful life of less than one year.

6.2.5. Replacement Parts

Items purchased as replacement parts for a particular piece of equipment are considered supply items since they do not enhance the value of the piece of equipment.

6.3. Return of Merchandise Purchased with a Purchase Order

In the case where merchandise must be returned to the vendor because it is not suitable or other reason, a duplicate shipment was received, please observe the following procedures:

- It is your responsibility to contact the vendor to explain the reason for the return and request a "Return Merchandise Authorization (RMA) Number." Ask the vendor if they will pay the return shipping charges, and if so, what procedure should be used to ship the merchandise. Often the vendor will send you a return-shipping label.
- Label the item with the vendor's name and address; write the Return Merchandise Authorization (RMA) Number clearly on the package next to the mailing label.
- Bring the package to the Department Office and notify our Accounting Specialist that the package is a return. Be sure to provide an account number to apply shipping charges.

6.4. Get a Tax Exempt Sales Certificate

JHU is a non-profit organization, and therefore, is exempt from paying sales tax. **If purchases are made with personal funds, sales tax will not be reimbursed.**

Purchasing equipment or materials with a personal credit card or with cash is not recommended, but if you absolutely need to do so, please obtain a copy of the tax-exempt sales certificate in the Department Office before making your purchase. Presenting this certificate at the time of purchase will eliminate sales tax from your bill, in most cases.

Note that some stores, e.g. Wal-Mart will require that you obtain an in-store tax exemption certificate in addition to the JHU tax exemption. Please check with the store before making purchases to ensure that you have all required documents.

6.5. Reimbursements

The Department office processes reimbursements for official travel and out-of-pocket expenses for the purchase of materials and supplies.

Reimbursements may be obtained in one of two ways:

- Up to $100.00: from the Petty Cash Office in Garland Hall using a Petty Cash Voucher.
- Over $100.00: Check requested from and paid through the Accounts Payable Office. Please allow up to three weeks for the reimbursement to be processed.

6.6. Travel

6.6.1. Preferred Vendor: World Travel Services

World Travel Services (WTS) is a preferred vendor for travel arrangements. They will send invoices instead of requiring a credit card up front, so your credit line will not be accessed or held while waiting for reimbursement or payments. Info is available at www.worldtravelservice.com and e-mail jhutravel@worldtravelservice.com.

6.6.2. Travel Expense Reimbursements

Reimbursement for travel expenses must be submitted with a completed and signed Travel Expense Report and will be processed and forwarded to the Accounts Payable Office. Allow two to three weeks for the reimbursement to be processed. Travel Expense Report forms can be obtained from the staff in the office.

It is the student's responsibility to complete the form and attach the necessary original receipts, obtain a signature approval, and account number from the Principal Investigator. In 2013, business mileage is reimbursed at 56.5 cents per mile.

6.6.3. Reimbursements for Air Travel

To reimburse air travel costs, you will need a credit card statement reflecting the cost of the ticket, along with payment confirmation from the airline. For upgrade, luggage, or other additional charges, a receipt is required. A flight itinerary from the airline will not be accepted because proof of payment is not indicated.

6.6.4. International Air Travel and the Fly America Act

The Fly America Act should be followed when foreign travel is required. Federal regulations require that individuals whose travel is supported by federal funds use American flag carrier airlines. Most sponsored accounts have federal fund sources. If you have questions, please see our Accounting Specialist before arranging air travel.

6.6.5. Automobile Insurance

JHU carries automobile insurance coverage; therefore, if you rent a car that is used for University business, DO NOT purchase additional insurance coverage. You will not be reimbursed for that purchase.

7. Payroll

Paychecks are distributed semi-monthly, on the 15th and the last day of the month. If payday falls on a weekend or holiday, paychecks are distributed the last regular working day preceding the payday. Checks or direct deposit notifications will be placed in your mailbox. For your convenience, Direct Deposit to your bank account is available; visit https://orchid.hosts.jhmi.edu/stujob/seoform/directDeposit.pdf for direct deposit forms. The form to cancel direct deposit is located at https://orchid.hosts.jhmi.edu/stujob/seoform/dd_Cancellation_form.pdf.

Many of our graduate students are paid a salary; a few are paid a stipend. Please make sure you understand whether you receive a *salary* or a *stipend*. The difference may have important tax ramifications, particularly for international students. International

students may contact the Office of International Student and Scholar Services at 410-516-1013, or the Tax Office at 443-997-8442 for assistance.

7.1. Salaries

The department determines the salaries for Research Assistants. Other financial assistance, criteria of the grant or contract on which you are performing research may cause your salary to vary from those of your colleagues. Research Assistants are paid from the research funds of their particular advisor.

Salaries are subject to Federal and State tax withholding, which is done automatically through the Payroll Office and will be reflected on the pay stub. American students will want to complete a W-4 Federal Tax withholding form and a MW-507 Maryland State withholding form and return them to the Student Employment Services office in the basement of Garland Hall.

Blank forms are available from the Department office and on the Controller's Office website at http://finance.jhu.edu/depts/tax/taxforms.htm. If you do not submit these forms, Payroll will tax you at the higher default rate.

7.2. Stipends

Stipends are paid to those students on Departmental or other Fellowships.

NOTE: Stipends usually have no income or other tax withheld. Students on fellowships are responsible to file and pay taxes.

Students receiving stipends may have to file quarterly withholding reports with the Internal Revenue Service. For information contact the Tax Office at http://finance.jhu.edu/depts/tax/index.html, 443-997-8442, or tax@jhu.edu.

8. 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.
Please also visit the Whiting School's Lab Safety page at http://eng.jhu.edu/wse/page/wse-laboratory-safety 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. Laboratory Administrator Niel Leon can also be contacted at 410-516-6752 for help.

8.1. Machine Shop

The Machine Shop is located in **Wyman Hall**. An orientation regarding shop safety, shop rules, and equipment operations is available.

This orientation is required to be allowed to work in the Machine Shop, and no one is authorized to work in the shop without the machinist's permission. Please contact Machinist Rich Middlestadt at 410-516-7710 or rmiddle4@jhu.edu to arrange your orientation.

8.2. Computer Labs

8.2.1. Services/Equipment

Located in Wyman G-06, the Senior Design Lab are several desktop computers, which are available for use seven days a week, 24 hours a day to any person with access to the space and login information. To gain access to the computers, each user must be assigned login information to the server. Contact Niel Leon at 410-516-6752 or nleon@jhu.edu for access.

8.2.2. Technical Information

The computers are primarily for use in conjunction with the Senior Design class, and as such, are oriented in software towards that goal. PRO-E, ANSYS, and FEMLAB are but a few of the programs available on the computers. Other software is available for installation on an as needed basis.

8.2.3. Procedures for Reserving Time/Space

The computers are available on a first come, first served basis, however, priority is given to those students involved with Senior Design. As long as a computer is available, anyone with access may use them. Once all computers are in use, then those not involved in Senior Design will be asked to make room for those who are. Conflicts will be resolved by the lab administrator.

8.2.4. Safety Procedures

There are no special safety procedures involved with computer use. All those using the computers are asked to keep the lab administrator informed of any problems that arise. Users are expected to keep their work areas neat and clean.

8.3. Laser Engraving and Cutting System

8.3.1. Services and Equipment

Located in Krieger Hall room K-16, the Universal Laser Systems model X2-660 Laser engraving and cutting system is available for use by all persons assigned within the ME department who have been properly trained in its operation. The laser cutter and engraver can be used with a variety of materials to include:

Acrylic – cast and extruded
Acrylic – mirrored
Aluminum – anodized
Brass – painted
Cork
Corian/Avonite/ Fountainhead
Delrin
Glass/Crystal
Leather
Marble
Matte Board
Melamine
Plastic – microsurfaced
Vinyl – sign (3 mil.)
Wood/wood inlay

8.3.2. Technical Information

The CO2 class 1 laser with Red Diode Pointer (class 111a) is contained with a 32"x18" work area. The system is air assisted and the air assist must be applied as described in the orientation class in order for the system to operate properly. A point of use filter with acrylic window is available to check the system for traces of water prior to laser operation. MSE cards are available for materials used with the system. A log is kept to indicate usage of the laser system. A small fee is charged to the appropriate Primary Investigator account number for each use of the system.

8.3.3. Procedures for Reservations

An orientation class is required before access is granted to the machine. Training is done on a scheduled basis on a need basis. Schedule training through the lab administrator at 410-516-6752. Once training is complete, the equipment is available on a seven-day / 24-hour first come – first serve basis. Conflicts in scheduling will be resolved by the lab administrator. Each user is responsible for signing in on the log with an appropriate account number, cleaning up the area after use, reporting any problems immediately to the lab administrator, and for safely operating the equipment. Failure in any of these areas will result in the loss of the privilege of using the equipment.

8.3.4. Contact Information

- Lab Administrator Niel Leon, Wyman G-06, 410-516-6752, nleon@jhu.edu.
- Computer Lab Technician Bob Blakely, 410-516-8660 or rblakel1@jhu.edu.

9. 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.

10. Facilities

10.1. Graduate Student Offices

As space provides, full-time Ph.D. graduate students are provided with a desk in a group office. In consultation with the faculty, the Department Administrator assigns the rooms. *Please note that the department does not furnish computers or other desk supplies.*

Mike Bernard will provide you with your office assignment, as well as arrange to issue you keys. A $5 deposit is charged for each key issued, which will be returned to you when you return the keys.

10.2. Libraries

The Milton S. Eisenhower Library makes available a number of carrels, or desks with lockers each year. The assignment of carrels is made in early fall. Graduate students interested in a carrel locker should notify the Academic Program Administrator.

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.

10.3. Computer Facilities

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.

10.3.1. Information Technology

The Information Technology Department at Johns Hopkins, whose web site is located at http://it.jhu.edu is the online resource for all 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.

10.3.2. Academic Computer Lab – Krieger Hall

The Academic Computer 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/.

10.3.3. Computer – Blocked Hosts

If the University believes or determines that a computer on its network is infected with a worm or virus, Information Technology Services (IT) will block the IP address of that computer until the worm or virus is removed. In the meantime the user's computer will be temporarily blocked from Internet access. Unfortunately, IT does not notify the computer's administrator that it is affected by this block.

If your computer suddenly has no Internet access, you may want to check if your computer has been blocked.

Visit http://www.it.johnshopkins.edu/restricted/security/blockedlist.html, click on "Blocked List" in the menu on the right side, and log in with your JHED ID. Look for your computer's unique IP address, follow the instructions to clear the virus or worm from your system and then notify IT, which will restore access.

10.3.4. Unique Internet Protocol Addresses

The Enterprise Network Architecture & Design Group (ENAD) is a division within Information Technology at Johns Hopkins that provides network engineering,

planning, and support services to the Johns Hopkins Medical and University Institutions for local, wide area, and metropolitan networks.

The ENAD Group is also responsible for commodity Internet and Internet2 connectivity, Residential Networking, Video Support and Coordination, Management of Metropolitan Area Networks, Project Management, Address management, Network Monitoring, DHCP, and the operation of dial-up modem pools.

ENAD is responsible for providing unique Internet Protocol (IP) addresses to eligible John Hopkins affiliates, and will assist you in obtaining an address for your laptop or desktop to allow Internet access through the Hopkins systems. To obtain a unique IP address for your computer, visit http://www.it.johnshopkins.edu/services/network/requests.

11. 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.

12. Groups and Activities

12.1. 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 grad student and MEGA representative Joel Bretheim at jbretheim@jhu.edu or visit http://www.me.jhu.edu/mega.html.

12.2. Women of Whiting

This organization serves to foster a sense of community and an environment of support among the graduate student women in the Whiting School. Monthly activities include luncheons with local female faculty and researchers and relaxed social events.

12.3. 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.

12.4. American Society of Mechanical Engineers (ASME)

Please visit the ASME Faculty Advisor, Dr. Steve Marra for information and application materials. Dr. Marra is available in Latrobe 123, at marra@jhu.edu. Information about ASME can be found at http://www.asme.org/.

12.5. 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. Xiaofeng Liu at XiaofengLiu@jhu.edu.

12.6. Extracurricular Activities

As a department, Mechanical Engineering participates in University intramural athletics. Mechanical Engineering has and will continue to field 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 notified of 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.

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

- Campus Life - http://webapps.jhu.edu/jhuniverse/campus_life/
- Arts and Culture - http://webapps.jhu.edu/jhuniverse/Arts_&_Culture/
- Baltimore Area Convention and Visitors Association - http://baltimore.org/
- Baltimore Office of Promotion and the Arts - http://www.bop.org/

13. 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.

14. Faculty and Staff

14.1. Faculty

Name	Telephone	E-mail	Office
Assistant Professor Ishan Barman	410-516-0656	ibarman@jhu.edu	103 Latrobe
Professor Greg Chirikjian	410-516-7127	gregc@jhu.edu	116 Hackerman
Associate Professor Noah Cowan	410-516-5301	ncowan@jhu.edu	126 Hackerman
Assistant Professor Jaafar El-Awady	410-516-6683	jelawady@jhu.edu	24 Latrobe
Assistant Professor Dennice Gayme	410-516-5784	dennice@jhu.edu	229 Latrobe
Professor Kevin Hemker	410-516-6451	hemker@jhu.edu	223 Latrobe
Professor Cila Herman	410-516-4467	cherman@jhu.edu	102 Latrobe
Professor Joe Katz	410-516-5470	katz@jhu.edu	219 Latrobe
Assistant Professor Marin Kobilarov	410-516-5943	mkobila1@jhu.edu	117 Hackerman
Senior Lecturer Steven Marra	410-516-5396	marra@jhu.edu	123 Latrobe
Professor Charles Meneveau	410-516-7802	meneveau@jhu.edu	127 Latrobe
Professor Rajat Mittal	410-516-4069	mittal@jhu.edu	126 Latrobe
Assistant Professor Vicky Nguyen	410-516-4538	vicky.nguyen@jhu.edu	125 Latrobe
Professor Andrea Prosperetti	410-516-8534	prosperetti@jhu.edu	119 Latrobe
Professor K. T. Ramesh	410-516-7735	ramesh@jhu.edu	122 Latrobe
Senior Lecturer Nathan Scott	410-516-5646	nscott@jhu.edu	G-06 Wyman
Associate Professor Sean Sun	410-516-4003	ssun@jhu.edu	105 Latrobe
Professor Jeff Wang	410-516-7086	thwang@jhu.edu	108 Latrobe
Professor and Chair Louis Whitcomb	410-516-6724	llw@jhu.edu	115 Hackerman
Assistant Professor Tamer Zaki	410-516-5699	tzaki1@jhu.edu	118 Latrobe

14.2. Administrative Staff

Name	Telephone	E-mail	Office
Kevin Adams, Academic Program Assistant	410-516-5930	kadams24@jhu.edu	223-D Latrobe
Barbara Adamson, Administrative Secretary	410-516-0463	brogow1@jhu.edu	128 Latrobe
Mike Bernard, Academic Program Administrator	410-516-7154	mike.bernard@jhu.edu	230 Latrobe
Bob Blakely, Mechanical Computing Technician	410-516-8660	rblakel@jhu.edu	B-2 Krieger
Marty Devaney, Sr. Administrative Manager	410-516-8542	mdevane2@jhu.edu	223-E Latrobe
Lorrie Dodd, Sr. Research Service Analyst	410-516-4175	ldodd@jhu.edu	223-F Latrobe
Melissa Selby, Budget Analyst	410-516-7132	mselby2@jhu.edu	223-G Latrobe
Niel Leon, Laboratory Administrator	410-516-6752	nleon@jhu.edu	G-06 Wyman
Brooke Mesta, Budget Analyst	410-516-5586	bmesta@jhu.edu	223-F Latrobe
Rich Middlestadt, Machinist	410-516-7710	rmiddle4@jhu.edu	3 Latrobe
Deana Santoni, Administrative Coordinator	410-516-6451	dsantoni@jhu.edu	223-B Latrobe
Phyllis Sevik, Sr. Research Service Analyst (HEMI)	410-516-3834	psevik@jhu.edu	209 Hackerman

14.3. Graduate Student Evaluation Form

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 _____