

# Graduate Study Manual



## M.S. and Ph.D.

School of Mechanical and Aerospace Engineering  
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<http://www.mae.okstate.edu>

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# Welcome Letter

Dear Student:

Welcome to the Oklahoma State University School of Mechanical and Aerospace Engineering (MAE) Graduate Program! You have joined a diverse, highly motivated group of faculty, staff, and students. The School of MAE includes scholars from across the world with a wide variety of background, skills, and ambitions. We anticipate your scholarship and determination will continue to add richness to our elite Program.

Please use this manual as a reference resource. This information has been compiled to provide a brief overview of Graduate requirements that will satisfy the University, Graduate College, Registrar, and the School of MAE.

As you pursue your degree, you will find that University and departmental information is continually being changed and updated. These updates are often posted on Web sites and bulletin boards outside offices such as the MAE office, the Graduate College, and the International Students and Scholars (ISS) office. Also, impending information is occasionally delivered to students through e-mail or postal mail. For this reason, it is imperative that your local contact information be kept up-to-date with both the School of MAE and the University.

The School of MAE will assist you in many areas of your Graduate studies. However, please be aware that, ultimately, it is your responsibility to know and satisfy all MAE, Graduate College, University, and Immigration and Naturalization Services (INS) requirements for attaining your degree.

Sincerely,



Afshin J. Ghajar, Ph.D., P.E.  
Regents Professor and Director of MAE Graduate Studies

# Admission Procedures

To qualify for admission to the Graduate Program in Mechanical and Aerospace Engineering (MAE), you must possess a degree from a recognized college or university. You must also rank in the upper ten percentile of your class or have a "B" average in your studies. Master's applicants must have a Bachelor's degree in Engineering, and Doctoral applicants must have a Master's degree in Engineering prior to the start semester they intend to join the program. As a Doctoral applicant, you must also have an advisor before you can be fully admitted. Your application will be distributed among MAE Faculty in your area(s) of interest, and if an appropriate Faculty member needs a Ph.D. student, he or she might choose to be your advisor.

The fastest and easiest way to apply to Oklahoma State University's Graduate Program is through the online application site. Please go to [www.gradcollege.okstate.edu](http://www.gradcollege.okstate.edu) to submit your application. You must create a user account before you can apply.

The application fee and all of the following documents must be submitted directly to the Graduate College to receive admission consideration:

- TOEFL scores [Not required for OSU Graduates and domestic students]
- GRE scores [Not required for OSU Graduates]
- One original transcript from each college or university attended (in English)
- Statement of Purpose clearly indicating one of the six areas of study you are interested in pursuing (Aerodynamics & Flight Dynamics, Applied Mechanics & Design, Biomechanics, Biofluid & Biomaterials, Dynamics & Control, Manufacturing & Materials, Thermal & Fluid Sciences) as well as the faculty member(s) that you share a common research interest with and would have an interest in working with
- Resume
- Three letters of recommendation (typed on official institution or corporation letterhead) [Not required for OSU Graduates]

To expedite the processing of your application, please do not include copies of project reports or awards and certificates you have received. If you would like to highlight specific accomplishments, please include them in bulleted format in your resume. We suggest that international applicants submit their applications by March 1<sup>st</sup> for fall admission and August 1<sup>st</sup> for spring admission in order to receive their I-20's in a timely manner.

Upon acceptance, you will automatically be considered for a teaching assistantship. *Please do not correspond with our department about possible financial aid.* We will immediately email a PDF of an official letter (to the email address listed on your Graduate application) if you have been awarded an assistantship. To be considered for a research assistantship the applicant must directly contact the MAE faculty in their area(s) of interest. Master's students will not, generally, be offered a research assistantship until after demonstrating at least a semester of hard work, motivation, and research proficiency within coursework and the laboratory setting. Doctoral applicants are usually offered research assistantships at the same time the applicant is admitted to the MAE Graduate Program.

Your application materials will be collected at the Graduate College, processed, and then sent to the MAE department for further processing. You should check with the Graduate College for any questions regarding the submission of your TOEFL, Transcripts, or Financial Documents. The Graduate Academic Secretary will inform you if the department has not received your GRE scores, Letters of Recommendation, Resume, or Statement of Purpose, should we find any of these items missing from your application. However, we have no way of knowing if your application is complete until it has been referred to the department for review. You will receive email notification from the Graduate College when your application has been referred to the MAE department. Once a decision has been made as to your admission, the Graduate College will contact you via postal mail. Please do not correspond with the School of MAE regarding admission status - we cannot provide admission decision information.

# Graduate Faculty

Name	Education	Area(s) of Interest
Arena, A.S. Professor Member Graduate Faculty	Ph.D., Notre Dame University M.S., Notre Dame University B.S., University of Arizona	Unmanned Aerial Systems Flight Dynamics/Control Aerodynamics
Chambers, F.W., P.E. Associate Professor Member Graduate Faculty	Ph.D., Purdue University M.S., University of Pennsylvania B.S., Purdue University	Fluid Mechanics Heat Transfer Acoustics
Conner, J.P. Adjunct Assistant Professor Member Graduate Faculty	Ph.D., Oklahoma State University M.S., Oklahoma State University B.S., Oklahoma State University	Unmanned Aerial Systems Aircraft Design and Fabrication Instrumentation Mechatronics
Cremaschi, L. Assistant Professor Member Graduate Faculty	Ph.D., University of Maryland M.S., University of Modena, Italy B.S., University of Modena, Italy	Thermal Fluid Systems Energy System Optimization HVAC Systems & Equipment Micro-Refrigeration Systems & Pumps
Delahoussaye, R.D. Adjunct Professor Member Graduate Faculty	Ph.D., Oklahoma State University M.S., Georgia Tech. B.S., Louisiana Tech.	Computer-Aided Design Design Optimization Robotics, Mechanisms
Fisher, D.E. Professor Member Graduate Faculty	Ph.D., University of Illinois M.S., University of Illinois B.S., University of Illinois	Thermal/Fluid Systems Building Systems Simulation Energy Conservation
Gaeta, R.J. Adjunct Associate Professor Member Graduate Faculty	Ph.D., Georgia Institute of Tech. M.S., University of Cincinnati B.S., Georgia Institute of Tech.	Unmanned Aerial Systems Aerospace Propulsion Aeroacoustics
Ghajar, A.J., P.E. Regents Professor Member Graduate Faculty	Ph.D., Oklahoma State University M.S., Oklahoma State University B.S., Oklahoma State University	Heat Transfer in Two-Phase Flow Heat Transfer in Mini/Micro Channels Mixed Convection Heat Transfer Computational Heat Transfer
Good, J.K., P.E. Professor Member Graduate Faculty	Ph.D., Oklahoma State University M.M.E., Oklahoma State University B.S., Oklahoma State University	Web Mechanics, Machine Design Structures/Dynamics Experimental Stress Analysis
Hanan, J. Associate Professor Member Graduate Faculty	Ph.D., California Inst. Of Technology M.S., California Inst. Of Technology B.S., Oklahoma Christian University	Materials Science Composites and Interfaces Data Reduction/Image Processing Non-Destructive Evaluation
Harimkar, S.P. Assistant Professor Member Graduate Faculty	Ph.D., University of Tennessee M.S., Indian Institute of Science B.S., Visvesvaraya National Institute of Technology	Laser Processing of Materials Surface Engineering Biomaterials Nanotechnology
Hatami-Marbini, H. Assistant Professor Member Graduate Faculty	Ph.D., Rensselaer Polytechnic Institute M.Sc., Rensselaer Polytechnic Institute M.Sc., Sharif University of Technology B.Sc., Sharif University of Technology	Multiscale Computational Mechanics Micro/Nano Mechanics of Materials Biomechanics and Biomaterials Composites

For more information about each Professor's research area(s),  
go to <http://www.mae.okstate.edu/faculty.html> and click on the Professor's "Personal Page" link.  
See also <http://www.mae.okstate.edu/research/facilities.html>.

# Graduate Faculty

(Continued)

Name	Education	Area(s) of Interest
Hoberock, L.L., P.E. Professor and Head Member Graduate Faculty	Ph.D., Purdue University M.S., Purdue University B.S., Univ. of Missouri-Rolla	Computer Vision & Machine Learning Mechatronics and Automation Dynamics & Controls of Electromechanical Systems Vibrating Screen Technology
Jacob, J.D., P.E. Professor Member Graduate Faculty	Ph.D., Univ. of California – Berkeley M.S., Univ. of California – Berkeley B.S., University of Oklahoma	Unmanned Aerial Systems Aerodynamics Flow Control Bio-Fluid Mechanics
Kalkan, K. Assistant Professor Member Graduate Faculty	Ph.D., Pennsylvania State University M.S., Pennsylvania State University B.S., Bogazici University, Turkey	Nanostructured Materials Nanodevices and Nanosensors Molecular Detection/Imaging Biomedical Monitoring
Lilley, D.G., P.E. Professor Member Graduate Faculty	D.Sc., Sheffield University, England Ph.D., Sheffield University, England M.S., Sheffield University, England B.S., Sheffield University, England	Combustion Heat Transfer Computational Fluid Dynamics Swirling Flows
Lucca, D.A. Regents Professor Member Graduate Faculty	Ph.D., Rensselaer Polytechnic Institute M.S., Princeton University B.S., Cornell University	Ultra-Precision Manufacturing Ion-Solid Interactions Surface Mechanics Surface Engineering Nanomechanical Behavior of Material
Morton, J.A. Adjunct Assistant Professor Member Graduate Faculty	Ph.D., North Carolina State University M.S., North Carolina State University B.S., North Carolina State University	Engineering Education Software Approximation Theory Computational Modeling Optimization of Complex Systems
Pagilla, P.R. Professor Member Graduate Faculty	Ph.D., Univ. of California-Berkeley M.S., Univ. of California-Berkeley B.S., Osmania University, India	Linear & Nonlinear Control Real-time Control Robotics Mechatronics
Rubenstein, D. Assistant Professor Member Graduate Faculty	Ph.D., Stony Brook University M.S, Stony Brook University B.E., Stony Brook University	Tissue Engineering Biofluid Flow Coagulation Cascade Nanofabrication
Sallam, K. Associate Professor Member Graduate Faculty	Ph.D., Univ. of Michigan-Ann Arbor M.S., Univ. of Michigan-Ann Arbor M.E., Cairo University, Egypt B.S., Cairo University, Egypt	Laser Diagnostics Atomization and Sprays Fluid Mechanics Nanotechnology
Singh, R.P. Professor Member Graduate Faculty	Ph.D., University of Rhode Island M.S., University of Rhode Island B. Tech., Indian Inst. of Tech., Kanpur	Solid Mechanics Experimental Mechanics Advanced Materials

For more information about each Professor's research area(s),  
go to <http://www.mae.okstate.edu/faculty.html> and click on the Professor's "Personal Page" link.  
See also <http://www.mae.okstate.edu/research/facilities.html>.

# Graduate Faculty

(Continued)

Name	Education	Area(s) of Interest
Spitler, J.D., P.E. Regents Professor Member Graduate Faculty	Ph.D., University of Illinois M.S., University of Illinois B.S., University of Illinois	Building Energy Analysis Thermal System Simulation Ground Source Heat Pumps
Taylor, R.M., P.E. Adjunct Associate Professor Member Graduate Faculty	Ph.D., Oklahoma State University M.S., Oklahoma State University B.S., Oklahoma State University	Measurements and Instrumentation Mechanical/Electrical System Design Antennas
Yin, W. Assistant Professor Member Graduate Faculty	Ph.D., Stony Brook University M.S., University of Akron B.E., Tianjin University, China B.A., Tianjin University, China	Biofluid Flow Cell-Platelet Interactions Inflammatory Responses Multi-scale Modeling
Young, G.E., P.E. Professor Member Graduate Faculty	Ph.D., Univ. of California-Berkeley M.S., Univ. of California-Davis B.S., Univ. of California-Davis	Dynamic Systems & Controls Uncertain & Nonlinear Systems Mechatronics

For more information about each Professor's research area(s),  
go to <http://www.mae.okstate.edu/faculty.html> and click on the Professor's "Personal Page" link.  
See also <http://www.mae.okstate.edu/research/facilities.html>.

# Master's Degree – Progress Sequence

Following is sequence of requirements compiled from both the Graduate College and the School of Mechanical and Aerospace Engineering. Failure to comply with these requirements in a timely manner will result in an enrollment hold, payroll delay (if applicable) or delay of your graduation.

## Week of Arrival

1. *International Students*: Report to the Graduate College (202 Whitehurst) for your initial check-in. As soon as you have checked in, proceed to the International Students and Scholars office to obtain an orientation schedule.
2. All Students (Domestic and International): Report to School of Mechanical and Aerospace Engineering (218 Engineering North) and meet with the Graduate Academic Secretary to obtain a new student information packet and to schedule a meeting with either the MAE Graduate Director or your pre-approved advisor to make enrollment selections for the upcoming semester.
3. Activate your O-Key email account (if you have not done so already) and ensure that you are enrolled in the proper courses. See the Graduate Academic Secretary if you have questions regarding enrollment.
4. If you have an assistantship, meet with the MAE Payroll Secretary to complete payroll forms.

## First Semester of Coursework

1. Select your permanent advisor (see the “Graduate Faculty” section of this manual in addition to the Professors’ Personal Pages at <http://www.mae.okstate.edu/faculty.html>). Only Members of the Graduate Faculty can serve as principal advisors and assign MAE 5000 Theses and MAE 5010 Creative Component projects.
2. With your advisor, select Thesis or Creative Component option.

## Second Semester of Coursework

Submit original Plan of Study to Graduate College and a copy to the MAE Graduate Academic Secretary sometime before end of the semester. When you are ready to file your Plan of Study, please see the “*Master’s Degree- Requirements, Plan of Study*” section of this manual for information on what to include in your Plan of Study.

## Semester of Graduation

1. Submit final/revise Plan of Study to the Graduate College and a copy to the MAE Graduate Academic Secretary by the end of the second week of classes. All revisions must be approved by your Advisor, initialed by the MAE Graduate Director and made on the approved copy of your original Plan of Study, which can be obtained from the Graduate Academic Secretary. If your initial committee members have changed, you must complete a **Committee Change Request** form, which can be accessed through the Graduate College website at [www.gradcollege.okstate.edu](http://www.gradcollege.okstate.edu). You must secure signatures from all previous and new committee members, as well as the Graduate Director, before final submission to the Graduate College.
2. Complete and submit Graduation Clearance Form (and Final Semester Verification, if applicable) to the Graduate College.
3. File diploma application on the Student Information System (SIS).
4. Complete requirements for Thesis or Creative Component option. Go to the Academic Calendar\* on the Graduate College Web site to view deadlines for each stage of completion of Thesis option. Creative Components must be defended prior to pre-finals week (two weeks before end of semester).
5. For the students that choose the *Thesis option*, the committee should complete the M.S. Assessment form and the M.S. Thesis Defense form at the time of your defense. For the students that choose the *Creative Component (Report) option*, the committee should complete the M.S. Creative Component Assessment form only. Note that the results of the Creative Component Defense are also reported on the Assessment form and there is not a separate form for reporting the results.
6. Creative Component students should ensure that your major Advisor submits a grade or a change of grade (if course was taken in the past) for your two (2) credit hours of MAE 5010 if they have not already.
7. Complete and return MAE Clearance Form to the Graduate Academic Secretary.

\*Please visit [www.gradcollege.okstate.edu](http://www.gradcollege.okstate.edu) for a link to the most current Graduate College Academic Calendar.



# Master's Degree – Requirements

The minimal University requirements for the M.S. degree are determined by the Graduate College and can be found in the *University Catalog* (<http://prodosu.okstate.edu>). We, in MAE, have additional requirements in several areas. You have two options for completion of your Master's degree:

## Thesis

A total of 30 credit hours, which includes **24 hours of formal coursework** (regularly scheduled classes, not independent study or research) and **six hours of MAE 5000** (Thesis) are required for the Thesis Option, see table below.

## Creative Component

A total of 35 credit hours, which includes **33 hours of formal coursework** (regularly scheduled classes, not independent study or research) and **two hours of MAE 5010** (Creative Component) are required for the Creative Component Option, see table below.

## **Plan of Study**

Graduate College rules state that M.S. students must have an approved plan of study on file before they have completed their 17<sup>th</sup> hour of coursework or a future enrollment hold will be placed on their account. Plan of Studies must now be completed electronically, and can be accessed through the Graduate College Web site at: [www.gradcollege.okstate.edu](http://www.gradcollege.okstate.edu). Your Plan of Study is to be completed with the assistance of your Advisor and it should be typed (all signatures need to be original). Please make sure you save the electronic file with your information in case you are asked to make changes. You are to collect the signature of your Advisor, two other faculty members, and the MAE Graduate Director, in the order indicated. You may choose a faculty member that is outside of our department, however, MAE faculty should comprise a majority of the Committee.

Your 30 (Thesis) or 35 (Creative Component) hours of coursework should satisfy the following (For a copy of the "MAE Graduate Course Offerings" sheet and the "Mathematics Requirements" sheet, please visit the Graduate Academic Secretary or our Web site at <http://www.mae.okstate.edu/grad.html>):

	<b>Mathematics<sup>1</sup></b> (see "Mathematics Requirements" sheet)	<b>5000- and 6000-level Courses<sup>2</sup></b> (see "MAE Graduate Course Offerings" sheet)	<b>Research Hours<sup>3</sup></b>	<b>(Optional) 4000-level MAE Courses<sup>4</sup></b> (As needed, consult the MAE Graduate Director)
<b>Thesis Option</b>	6 hours	12 to 18 hours	MAE 5000 (6 hours)	6 hours or less of courses approved for Graduate credit (see Course Offerings)
<b>Creative Component Option</b>	6 hours	21 to 27 hours	MAE 5010 (2 hours)	6 hours or less of courses approved for Graduate credit (see Course Offerings)

<sup>1</sup>Your mathematics requirement may be waived by the MAE Graduate Director, if you have received prior credit for taking advanced mathematics courses as Undergraduate electives.

<sup>2</sup>At least 50% of the total required coursework credit hours, **exclusive of report or thesis hours** (ex: 50% of 24 hours for Thesis, and 50% of 33 hours for Creative Component) must be 5000- and 6000-level MAE courses (see Course Offerings).

<sup>3</sup>You must obtain a permission memo from the Graduate Academic Secretary in order to enroll in MAE 5010.

<sup>4</sup>No more than three 4000 level courses can be included on your Plan of Study. This includes any 4000-level approved MATH courses you have taken or plan to take.

Only those courses listed for Graduate credit in the OSU University Catalog (having an asterisk) and acceptable to the student's advisor can be used on the Plan of Study. DO NOT take non-MAE or MATH courses without *prior* approval of your advisor and the MAE Graduate Director. Your major Advisor must approve all changes to your Plan of Study *before* you enroll in any course not on your existing Plan of Study. Approval WILL NOT be given retroactively.

An overall grade point average of 3.0 is required for all **formal coursework** listed on the Plan of Study.

The completed Plan of Study must be taken to the Graduate Academic Secretary for internal processing before submission (by the student) to the Graduate College.

### **Final Examination**

An oral examination is required of all M.S. candidates. All candidates that are to be cleared for graduation in a given semester must be approved for graduation by a majority of the MAE Graduate Faculty. The MAE Graduate Director will poll the faculty and at his/her discretion may choose to call a faculty meeting (if dissent exists). At any faculty meeting, approval for graduation must be by a majority of the MAE Graduate Faculty in attendance.

#### **Examining Committee**

The Examining Committee for all M.S. candidates will consist of at least three members of the Graduate Faculty, two of which must be members of the MAE faculty. This committee is not necessarily the same faculty who signed your Plan of Study. However, if your committee deviated from the people listed on your Plan of Study, you must document these changes by having each member sign the appropriate Committee Change Request form. This form must be filed with the Graduate College at the time you submit your Results of Oral Defense Form (only applicable for Thesis students).

#### **Form of Examination**

You must make a twenty- to thirty-minute presentation of your Thesis or Creative Component, answer questions from the audience in an open session, and again later in closed session with the Committee. The Committee may also question you in regards to your understanding of general coursework, ensuring competency within your chosen area(s) of mechanical engineering. The total examination does not usually exceed two hours.

#### **Result of Examination**

The Committee will deliberate in closed session at the end of the examination and may announce their recommendation immediately following. A majority vote suffices. The recommendation will be one of the following: 1) pass, 2) pass, with minor corrections before final approval to submit the document will be given 3) undergo a major rewrite and retake the examination the following semester, or 4) fail. (The 'fail' recommendation will not be given before the student has had an opportunity to retake the examination.) The Committee must also make a recommendation concerning study for the Ph.D. degree. Only the Thesis Option M.S. candidates will be considered for recommendation for the Ph.D. degree.

#### **M.S. Thesis or M.S. Creative Component Report Research Grades**

At the end of each semester, Thesis Research hours (MAE 5000) will receive either a grade of "SR" (for Satisfactory Research) or "UR" (for Unsatisfactory Research). Only six hours that have received a grade of "SR" can be used on a student's Plan of Study. Research hours will not be calculated into the student's GPA.

An M.S. Thesis student who receives a research grade of "UR" will be subject to the following disciplinary actions: After three total hours of MAE 5000 resulting in a grade of "UR" the student will be placed on Academic Probation. Subsequently, after six total hours of MAE 5000 resulting in a grade of "UR" the student will be terminated from the MAE Graduate Program.

For an M.S. Creative Component student, the Creative Component hours (MAE 5010) can be assigned a grade of “R” until the final project is presented and graded. After the project is completed, the MAE 5010 hours will receive the appropriate letter grade corresponding to the quality of work as determined by the committee’s assessment. You must make at least a “B” on your Creative Component (MAE 5010).

### **Report of M.S. Final Thesis Defense**

The committee will complete the “**Thesis Oral Defense Results**” form and it should be returned to the Graduate Academic Secretary, immediately following the defense. The Graduate Academic Secretary will then submit the Thesis Defense form to the Graduate College on your behalf.

### **M.S. Thesis or M.S. Creative Component Report Assessment Form**

This assessment was designed by the MAE Graduate Faculty to evaluate M.S. student’s research ability and communication skills, both written and oral, upon completion of their M.S. Thesis defense or M.S. Creative Component defense. A copy of this form should be obtained from the Graduate Academic Secretary and should be returned at the close of your oral defense. Each committee member, including your chair must sign this form and the entire committee should assign a single score of 5, 4, 3, 2, or 1 to each individual category.

### **Procedure of Administration**

#### **Thesis Option**

- The OSU Graduate College specifies the correct format for Theses. Go to the Graduate College Web site for the *Graduate College Thesis/Dissertation Manual*: [www.gradcollege.okstate.edu](http://www.gradcollege.okstate.edu).
- You must follow the specific Thesis deadlines outlined in the Academic Calendar and the Graduation Checklist located on the Graduate College Web site. There are no exceptions to the dates listed.
- You must submit a final draft, approved by your major Advisor to each member of your Examining Committee. You are responsible for obtaining necessary paperwork from the Graduate Academic Secretary before your final examination.
- You are also responsible for scheduling a meeting with the appropriate Graduate College personnel or attending a Thesis draft workshop put on by the Graduate College. Please visit their Web site for workshop details.
- Your major Advisor will schedule the examination. Exams will not be scheduled during pre-finals week through the date on which final grades are due for the semester.
- You must send an e-mail (at least 48 hours in advance) to the Graduate Academic Secretary including the time and location of your defense and a PDF of your abstract so the MAE Graduate Students as well as the MAE faculty can be notified of your presentation.
- After you have taken the oral examination and made all corrections recommended by your Committee, submit an electronic copy of the corrected thesis (go to the Graduate College for submission instructions), an original signature page signed by all of your committee members, and two copies of the abstract to the Graduate College (on Thesis Bond Paper).
- Your major Advisor should submit the signed M.S. Assessment form and the signed original Thesis Defense form to the Graduate Academic Secretary immediately following your defense. The Graduate Academic Secretary will then submit the Thesis Defense form to the Graduate College on your behalf.

#### **Creative Component Option**

- The format for your Creative Component report is at the discretion of your major Advisor.
- A final draft of the report must be submitted to all members of the Examining Committee one week prior to your exam. The draft must be approved by your major Advisor before distribution to the Committee.
- The report must be in an approved, professional format including a literature review that provides an overview of the state of the art.

- Your major Advisor will schedule the examination. Exams will not be scheduled during pre-finals week through the date on which final grades are due for the semester.
- You must send an e-mail (at least 48 hours in advance) to the Graduate Academic Secretary including the time and location of your defense and a PDF of your abstract so the MAE Graduate Students as well as the MAE faculty can be notified of your presentation.
- Your major Advisor should submit the M.S. Creative Component (Report) Assessment Form to the Graduate Academic secretary, following your committee's evaluation of the Master's Report Presentation. This form is filed with the department only and should not be submitted to the Graduate College.

### **Clearance Form**

The MAE Graduate Clearance Form will be provided to you at the time of your final examination. If you choose to leave the MAE Graduate Program before completing your degree, the Clearance Form still *must* be completed before leaving the campus either when graduating or dropping out of school, or continuing on for your Ph.D. degree. ***It is your responsibility to complete and return the Clearance Form to the Graduate Academic Secretary. Failure to do so will result in a hold being placed on your graduation and/or your transcript.***

# Doctoral Degree – Progress Sequence

Following is sequence of requirements compiled from both the Graduate College and the School of Mechanical and Aerospace Engineering. Failure to comply with these requirements in a timely manner will result in an enrollment hold, payroll delay (if applicable) or delay of your graduation.

## Week of Arrival

1. *International Students*: Report to the Graduate College (202 Whitehurst) for your initial check-in. As soon as you have checked in, proceed to the International Students and Scholars office to obtain an orientation schedule.
2. All Students (Domestic and International): Report to School of Mechanical and Aerospace Engineering (218 Engineering North) and meet with the Graduate Academic Secretary to obtain a new student information packet and to schedule a meeting with your pre-approved advisor to make enrollment selections for the upcoming semester.
3. Activate your O-Key email account (if you have not done so already) and ensure that you are enrolled in the proper courses. See the Graduate Academic Secretary if you have questions regarding enrollment.
4. If you have an assistantship, meet with the MAE Payroll Secretary to complete payroll forms.

## First Eleven Months of Coursework

1. Consult with your Advisor regarding selection of your Advisory Committee.
2. Enroll in only one (1) hour of MAE 6010 in your Advisor's section for preparation of your preliminary research problem. Do not enroll in this one credit course until the semester (either first or second) you know you will present your preliminary exam, as you must receive a grade at the end of the semester for this course. You must receive a permission memo from the Graduate Academic Secretary in order to enroll in MAE 6010.
3. Develop a tentative Plan of Study with the assistance of your major Advisor. When you are ready to file your Plan of Study, please see the "*Doctoral Degree – Requirements, Plan of Study*" section of this manual for information on what to include in your Plan of Study.
4. Schedule and complete your oral Preliminary Exam.
5. Submit a signed Admission to Doctoral Candidacy Form to the Graduate Academic Secretary and this form will be submitted on your behalf to the Graduate College.
6. Ensure that your major Advisor submits a grade or a change of grade (if course was taken in the past) for your one (1) credit hour of MAE 6010 if this has not already been done.

## Halfway Through Your Doctoral Studies

1. Schedule and take the Qualifying Examination.
2. Your major Advisor should submit the results of your Qualifying Examination to the Graduate Academic Secretary immediately following its completion.

## Semester of Graduation

1. Work on and complete your Dissertation.
2. Submit final/revised Plan of Study to the Graduate College and a copy to the MAE Graduate Academic Secretary by the end of the second week of classes. All revisions must be approved by your Advisor, initialed by the MAE Graduate Director and made on the approved copy of your original Plan of Study, which can be obtained from the Graduate Academic Secretary. If your initial committee members have changed, you must complete a **Committee Change Request** form, which can be accessed through the Graduate College website at [www.gradcollege.okstate.edu](http://www.gradcollege.okstate.edu). You must secure signatures from all previous and new committee members, as well as the Graduate Director, before final submission to the Graduate College.
3. Complete and submit Graduation Clearance Form (and Final Semester Verification, if applicable) to the Graduate College.
4. File diploma application on the Student Information System (SIS).
5. Complete requirements for the Dissertation. Go to the Academic Calendar\* on the Graduate College Web site to view deadlines for each stage of completion.
6. Complete and return the "MAE Graduate Clearance Form."

\*Please visit [www.gradcollege.okstate.edu](http://www.gradcollege.okstate.edu) for a link to the most current Graduate College Academic Calendar

# Doctoral Degree – Requirements

The minimal University requirements for the Ph.D. degree are determined by the Graduate College and can be found in the *University Catalog* (<http://prodosu.okstate.edu>). We, in MAE, have additional requirements in several areas.

## Plan of Study

Graduate College rules state that Ph.D. students must have an approved plan of study on file before they have completed their 28<sup>th</sup> hour of coursework or a future enrollment hold will be placed on their account. Plan of Studies must now be completed electronically, and can be accessed through the Graduate College Web site at: [www.gradcollege.okstate.edu](http://www.gradcollege.okstate.edu). Your Plan of Study is to be completed with the assistance of your Advisor and it should be typed (all signatures need to be original). Please make sure you save the electronic file with your information in case you are asked to make changes. You are to collect the signature of your Advisor, other Advisory Committee members (minimum of three), and the MAE Graduate Director, in the order indicated. You must select an Advisory Committee. Your Advisory Committee can have four or five members and must consist of the following:

1. Major Advisor, or Committee Chairperson who is usually the Dissertation (Doctoral Thesis) Advisor. The Committee Chairperson must be a member of the Graduate Faculty with Ph.D. chairing privileges.
2. A mathematics, engineering (outside MAE), or science professor.
3. MAE faculty should comprise a majority of the Committee. For students working on a multi-disciplinary project, an additional faculty member from another school or department related to your field of study can serve on your committee.

### Your Ph.D. Plan of Study must contain:

1. 60 hours of acceptable Graduate work beyond the M.S. Degree, 29 hours of which can be research (MAE 6000).
2. 1 hour of MAE 6010, to be taken the same semester as the Preliminary Examination in order to be assigned a letter grade.
3. 24 to 30 hours of 5000- and 6000-level coursework beyond the M.S. Degree.
4. MAE 5000- and 6000-level courses for at least 50% of Graduate coursework.
5. A minimum of 6 hours of mathematics beyond the requirements for the OSU M.S. Degree.
6. An overall grade point average of 3.0 is required for all **formal coursework** listed on the Plan of Study.

Your hours of Doctoral coursework must include the following (For a copy of the “MAE Graduate Course Offerings” sheet and the “Mathematics Requirements” sheet, please visit the Graduate Academic Secretary or our Web site at <http://www.mae.okstate.edu/grad.html>):

Mathematics (see “Mathematics Requirements” sheet)	5000- and 6000-level Courses (see “MAE Graduate Course Offerings” sheet)	Research Hours
6 hours	24 to 30 hours (at least 50% of Graduate coursework must be MAE*)	MAE 6000 (29 hours)  MAE 6010** (1 hour)

\*MAE Ph.D. Students are not permitted to count any 4000-level coursework on their Plan of Study outside of approved MATH courses.

\*\*You must receive a permission memo from the Graduate Academic Secretary in order to enroll in MAE 6010.

## **Preliminary Examination**

### **Proposal**

After appointment of your Advisory Committee, your Advisor should call a meeting. The purpose of this initial meeting is to acquaint you with the Advisory Committee and begin the preliminary examination procedure. Your major Advisor will assign you a topic for your research proposal (MAE 6010). This topic should be your final Dissertation topic. The intent of the MAE 6010 project and the Preliminary Examination is to demonstrate your ability to prepare a worthwhile research plan. Advisory Committee approval of the topic will allow you to promptly begin the proposal for submission and defense (to be completed by the end of the eleventh month in the Ph.D. Program).

### **Credit**

You should enroll in one (1) hour of MAE 6010, in your Major advisor's section.

### **Examination**

The Preliminary Examination must be taken within eleven months of enrollment in the Ph.D. Program. The Examination will consist of one or more of the following options:

1. You are required to develop a research proposal. The proposal is expected to be approximately 50 pages (of quality content) in length. The Advisory Committee may ask any questions about the proposal as well as any engineering fundamentals, mathematics, or scientific areas covered by previous coursework as deemed necessary to evaluate and verify your potential for continuing in the Ph.D. Program. This proposal must be related to your Ph.D. Dissertation (Doctoral Thesis). This type of Preliminary Examination is designed to determine your abilities to: 1) identify a problem, 2) search the literature, 3) define a theoretical, experimental, and/or computational approach, and 4) plan a research program.
2. As an alternative, or in addition to option 1 (additional if the Committee deems that, after not passing option 1, you should be given another opportunity to pass the Preliminary Examination), the Interviewing Advisory Committee may select the topic on which you are to write the proposal. Then, during the summer or between academic semesters, the Advisory Committee will provide you the topic two or three weeks before the proposal is due. During that two or three weeks, you are to work intensively and exclusively on this proposal, understanding the topic, searching the literature, carefully formulating the problem, and writing a potential research plan and/or solution procedure. At the conclusion of the two or three weeks, you will deliver your written document to the Advisory Committee. Two days later, you will orally present the proposal to the Advisory Committee. The proposal is expected to be approximately thirty pages (of quality content) in length. Similar to option 1, the Advisory Committee may ask any relevant questions about the proposal and/or coursework as deemed necessary to evaluate and verify your potential for continuing in the Ph.D. Program.
3. A series of written exams, taken over a two or three day time period, may be required of any student whom the Advisory Committee discovers to have a weak background in any area of previous coursework in engineering fundamentals, mathematics, or science. The Advisory Committee may have identified this weakness in background from informal interviews, examination of your transcripts, or through the formal Preliminary Examination process or option 1 or 2 above. One month in advance of these written exams, the Advisory Committee shall specify the coverage of the exams, what is considered to be a passing grade on these exams, and the rules for taking the exams (ex: allowance for open books and/or crib sheets, and length of time given).
4. A series of oral exams, taken over a two or three day time period, may be required of any student whom the Advisory Committee discovers to have a weak background in any area of previous coursework in engineering fundamentals, mathematics, or science. The same comments made with regard to written exams (in option 3 above) are applicable for oral exams, with regard to identification of weakness(es), potential breadth of exams, notice to the student, and Advisory Committee participation.

If the Advisory Committee gives you a second chance to pass the Preliminary Examination, by allowing you to take any one of options 1, 2, 3, or 4, and the Advisory Committee's assessment is that, as a result

of that second chance, you do not receive an A or a B on the Preliminary Examination, there will be no third opportunity to take the Preliminary Examination. You will automatically be removed from the Ph.D. Program in the School of MAE.

### **Objectives of the Examination**

1. Redirect candidates with poor prospects of success in the Ph.D. Program before the students have made large investments of time and resources.
2. Provide a focal point for the student's Advisory Committee to evaluate his/her potential and consider his/her Plan of Study.
3. Demonstrate the student's familiarity with literature, ability to organize a research proposal, competence in oral and written communication, and his/her understanding of engineering fundamentals, mathematics, and areas of science related to his/her chosen field of specialization.

### **Grade**

A or B	Encouraged to continue Ph.D. Program
I	Conditional continuation in Ph.D. Program, with a reevaluation during the following semester under options 1 or 2, or with a reevaluation within a month under options 3 and/or 4
C, D, or F	Termination of Ph.D. Program

### **Preliminary Examination Report**

The Advisory Committee will complete the "Preliminary Examination" results form and return to the Graduate Academic Secretary immediately following the defense.

### **Length of Examination**

The oral exams of options 1 and 2 can last up to three hours in duration. The battery of written and oral exams of options 3 and 4 can be up to 12 hours each in duration.

### **Overall Time Limit**

*The maximum time that a student can take to complete the Preliminary Examination is 16 months after enrollment in the Ph.D. Program.* If the student has not passed the Examination within that time, the student will automatically be removed from the MAE Ph.D. Program.

## **Ph.D. Candidacy Form**

To be admitted to candidacy, a doctoral student must have (1) an approved Plan of Study on file with the Graduate College and (2) satisfactorily completed the Preliminary Exam.

As part of fulfilling degree completion requirements, a Ph.D. student must successfully complete (grades of 'SR') at least 10 hours of Dissertation (MAE 6000) coursework after being admitted to candidacy. If a student is admitted to candidacy prior to the end of the eighth week of a regular semester or prior to the end of the fourth week of an eight-week summer session, one-half of the Dissertation credits taken that term can be counted toward this minimum hour requirement. It is recommended that this form is completed immediately following successful completion of the Preliminary Exam.

## **Qualifying Examination**

### **Written Examinations**

Optional [exercised by your Advisory Committee]; required when any member of your Advisory Committee or the MAE Graduate Committee deems necessary to:

- Remove all doubt as to significant weaknesses in a student's academic qualifications.
- Evaluate a student's qualification in an area with respect to other candidates.

### **Oral Examination**

Required; includes a defense of the proposed Dissertation subject, scope, and strategy; establishes the student's qualification to undertake his/her proposed research.



### **Typewritten Prospectus**

Required; a typewritten prospectus must be submitted to each member of your Advisory Committee. The prospectus must contain:

1. Definition of Dissertation problem
2. Background and literature survey
3. Strategy for completion of Degree
4. Outline of proposed study

This prospectus should have greater depth and detail than the MAE 6010 proposal presented at the Preliminary Exam, and must contain partial analysis or some experiments and computations to prove the feasibility of the methods chosen. ***However, the Qualifying Exam must not be delayed until work is completed – it should not be taken less than six months before the Dissertation Defense.***

### **Report of Qualifying Examination**

The Committee will complete the “Qualifying Examination” results form and it should be returned to the Graduate Academic Secretary, immediately following the Qualifying Examination.

### **Final Examination**

An oral examination is required of all Ph.D. candidates and is used to determine the validity and significance of the research and whether you have demonstrated initiative and creative intelligence. All candidates that are to be cleared for graduation in a given semester must be approved for graduation by a majority of the MAE Graduate Faculty. The MAE Graduate Director will poll the faculty and at his/her discretion may choose to call a faculty meeting (if dissent exists). At any faculty meeting, approval for graduation must be by a majority of the MAE Graduate Faculty in attendance.

### **Examining Committee**

The Examining Committee for all Ph.D. candidates will consist of at least four members of the Graduate Faculty, three of which must be members of the MAE faculty. This committee is not necessarily the same faculty who signed your Plan of Study. However, if your committee deviated from the people listed on your Plan of Study, you must document these changes by having each member sign the appropriate Committee Change Request form. This form must be filed with the Graduate College at the time you submit your Results of Oral Defense Form.

### **Form of Examination**

You must make a thirty- to forty-minute presentation of your Dissertation, answer questions from the audience in an open session, and again later in closed session with the Advisory Committee. The Advisory Committee may also question you in regards to your understanding of general coursework, ensuring competency within your chosen area(s) of mechanical engineering. The total examination does not usually exceed three hours.

### **Result of Examination**

The Committee will deliberate in closed session at the end of the examination and may announce their recommendation immediately following. A majority vote suffices. The recommendation will be one of the following: 1) pass, 2) pass, with corrections before final approval to submit the document will be given or 3) fail (this means you will be terminated from the program).

### **Ph.D. Dissertation Research Grades**

At the end of each semester, MAE 6000 courses will receive either a grade of “SR” (for Satisfactory Research) or “UR” (for Unsatisfactory Research). Only hours that have received a grade of “SR” can be used on a student’s Plan of Study. Grades for research hours will not be calculated into the student’s GPA.

A Ph.D. student who receives a research grade of “UR” will be subject to the following disciplinary actions: Following the completion of the Preliminary Exam, a student earning six total hours of MAE 6000 resulting in a grade of “UR” will be placed on Academic Probation. Subsequently, after earning 12 total

hours of MAE 6000 resulting in a grade of “UR”, the student will be terminated from the MAE Graduate Program.

### **Report of Ph.D. Final Dissertation Defense**

The committee will complete the “**Dissertation Oral Defense Results**” form and it should be returned to the Graduate Academic Secretary, immediately following the defense. The Graduate Academic Secretary will then submit the Dissertation Defense form to the Graduate College on your behalf.

### **Ph.D. Dissertation Assessment Form**

This assessment was designed by the MAE Graduate Faculty to evaluate Ph.D. student’s research ability and communication skills, both written and oral, upon completion of their Ph.D. Dissertation defense. A copy of this form should be obtained from the Graduate Academic Secretary and should be returned at the close of your oral defense. Each Advisory Committee member, including your chair must sign this form and the entire committee should assign a single score of 5, 4, 3, 2, or 1 to each individual category.

### **Procedure of Administration**

- The OSU Graduate College specifies the correct format for Theses. Go to the Graduate College Web site for the *Graduate College Thesis/Dissertation Manual*: [www.gradcollege.okstate.edu](http://www.gradcollege.okstate.edu).
- You must follow the specific Dissertation deadlines outlined in the Academic Calendar and the Graduation Checklist located on the Graduate College Web site. There are no exceptions to the dates listed.
- You must submit a final draft, approved by your major Advisor to each member of your Examining Committee. You are responsible for obtaining necessary paperwork from the Graduate Academic Secretary before your final examination.
- You are also responsible for scheduling a meeting with the appropriate Graduate College personnel or attending a Dissertation draft workshop put on by the Graduate College. Please visit their Web site for workshop details.
- Your major Advisor will schedule the examination. Exams will not be scheduled during pre-finals week through the date on which final grades are due for the semester.
- You must send an e-mail (at least 48 hours in advance) to the Graduate Academic Secretary including the time and location of your defense and a PDF of your abstract so the MAE Graduate Students as well as the MAE faculty can be notified of your presentation.
- After you have taken the oral examination and made all corrections recommended by your Advisory Committee, submit an electronic copy of the corrected Dissertation (go to the Graduate College for submission instructions), an original signature page signed by all of your Advisory Committee members, and two copies of the abstract to the Graduate College (on Thesis/Dissertation Bond Paper).
- Your major Advisor should submit the signed Ph.D. Assessment form and the signed original Dissertation Defense form to the Graduate Academic Secretary immediately following your defense. The Graduate Academic Secretary will then submit the Dissertation Defense form to the Graduate College on your behalf.

### **Publications**

You are strongly encouraged by the School of MAE and the University to publish technical papers based on the research obtained through your Dissertation prior to your final defense.

### **Clearance Form**

The MAE Graduate Clearance Form will be provided to you at the time of your final examination. If you choose to leave the MAE Graduate Program before completing your degree, the Clearance Form still must be completed before leaving the campus either when graduating or dropping out of school. ***It is your responsibility to complete and return the Clearance Form to the Graduate Academic Secretary with. Failure to do so will result in a hold being placed on your graduation and/or your transcript.***

# Teaching and Research Assistantships

## Teaching Assistantships (TA)

A limited number of teaching assistantships are offered each semester. Most TA offers are made at the same time an applicant is admitted to the Graduate Program. Other students might receive TA assignments after demonstrating hard work and motivation for at least one semester. These assistantships are usually quarter-time or half-time. Quarter-time teaching assistantships require about ten hours of work per week; half-time assistantships require approximately twenty hours of work each week. Teaching assistants can be assigned any of the following duties: lead discussion sections, assist in the laboratory, grade papers, hold office hours, and other miscellaneous activities.

No teaching assistantship offers will be made upon admission to international students with a score of less than 22 on the Speaking portion of the Internet Based TOEFL (iBT). To become a teaching assistant for subsequent semesters past admission you must adhere to the English testing procedures outlined below and you must also adhere to the minimum GPA requirement outlined in the TA Reappointment section of this page.

- OSU policy requires all persons for whom English is a second language to demonstrate an acceptable level of spoken English before being employed in an instructionally related capacity, including laboratory assignments.
- Students who score a 26 or better on the speaking portion of the iBT or an IELTS speaking score of 8.5 or higher will be cleared for classroom or lab instruction. Prospective teaching assistants with iBT speaking scores of 22, 23 or 24, or IELTS speaking scores of 7.0, 7.5 or 8.0 will be required to pass the OSU-administered ITA Test in order to be certified for classroom or lab instruction. Prospective teaching assistants with iBT speaking scores below 22 or IELTS speaking scores below 7.0 are advised to seek English language training in order to improve their spoken language proficiency. After one semester of residence at OSU, students who wish to demonstrate that their English has improved sufficiently to be considered for teaching or lab assignments may take the Versant English Test, administered by the OSU Office of Testing and Assessment. A passing score on the Versant will enable the student to take the ITA test at its next regular administration.
- Prospective teaching assistants who do not achieve a 26 or better on the speaking portion of the iBT are required to pass the OSU-administered ITA test. The ITA test is a 10-minute evaluation procedure in which the student presents five minutes of information for an undergraduate lab, recitation, or lecture. Each ITA Test (the five minute mini-lesson and the question and answer period) is evaluated by two faculty members from the English Department, a faculty member from the student's department and a small group of undergraduate students. A score of 250 or better on the ITA test is an unconditional pass. A score of at least 240 is a provisional pass requiring the graduate assistant, if he or she is assigned to instructional duties, to concurrently enroll in GRAD 5991, a one credit course. Students who score less than 240 may not be employed in an instructionally related capacity. Students who fail the ITA may retake it if they have either passed or are currently enrolled in GRAD 5991.

For more information on the Versant and ITA exams please visit the University Testing and Assessment Web site: <http://www.uat.okstate.edu/>.

## TA Reappointment Information

It is our policy that only students with an overall GPA of 3.0 and a semester GPA of 3.0 (with no grade less than a B) are eligible to be considered for a teaching assistantship.

## Research Assistantships (RA)

Many Graduate students are hired by professors to work on funded research projects. These students conduct research for faculty member(s), and are paid by the School of MAE.

Master's students will not, generally, be offered a research assistantship until after demonstrating at least a semester of hard work, motivation, and research proficiency within coursework and the laboratory setting. Doctoral applicants are usually offered research assistantships at the same time the applicant is admitted to the Graduate Program.

## RA Reappointment Information

Reappointment of RA's will be at the individual faculty's discretion and will be contingent upon coursework performance, lab performance and availability of funds.

# Online Resources

**School of Mechanical and Aerospace Engineering:** [www.mae.okstate.edu](http://www.mae.okstate.edu)

Graduate Program: <http://www.mae.okstate.edu/grad.html>

Graduate Student Manual: <http://www.mae.okstate.edu/grad/files/GraduateStudyManual.pdf>

Graduate Course Offerings: [http://www.mae.okstate.edu/grad/files/Graduate\\_Course\\_Offerings.pdf](http://www.mae.okstate.edu/grad/files/Graduate_Course_Offerings.pdf)

Mathematics Requirements: [http://www.mae.okstate.edu/grad/files/Mathematics\\_Requirements.pdf](http://www.mae.okstate.edu/grad/files/Mathematics_Requirements.pdf)

Faculty Profiles: <http://www.mae.okstate.edu/faculty.html>

**Oklahoma State University:** [www.okstate.edu](http://www.okstate.edu)

University Catalog: <http://www.okstate.edu/registrar/Catalogs/Catalog.html>

Student Information System (SIS): <http://prodosu.okstate.edu/>

**Graduate College:** [www.gradcollege.okstate.edu](http://www.gradcollege.okstate.edu)

**University Assessment and Testing (UAT):** <http://www.uat.okstate.edu>

Versant Exam: [http://www.uat.okstate.edu/index.php?option=com\\_content&view=article&id=52&Itemid=87](http://www.uat.okstate.edu/index.php?option=com_content&view=article&id=52&Itemid=87)

ITA Exam: [http://www.uat.okstate.edu/index.php?option=com\\_content&view=article&id=53&Itemid=87](http://www.uat.okstate.edu/index.php?option=com_content&view=article&id=53&Itemid=87)

**International Students and Scholars Office:** <http://union.okstate.edu/iss/index.htm>

**Registrar:** <http://registrar.okstate.edu/>

**OSU Bursar:** <http://bursar.okstate.edu>

Tuition Estimator: <http://bursar.okstate.edu/tuitionEstimate.asp>

**Residential Life (Student Housing):** <http://reslife.okstate.edu/>

**Edmon Low Library:** [www.library.okstate.edu](http://www.library.okstate.edu)