GRADUATE HANDBOOK

OF THE

DEPARTMENT OF AEROSPACE ENGINEERING
AND ENGINEERING MECHANICS

UNIVERSITY OF CINCINNATI

Paul Orkwis
Director of Graduate Studies
AsE/EM

May 2006
ADMINISTRATIVE OFFICERS

PROF. P. ORKWIS  DIRECTOR OF GRAD. STUDIES, AsE/EM  (513) 556-3366
PROF. A. HAMED  DEPARTMENT HEAD, AsE/EM  (513) 556-3553
DR. R. ECKART  DEAN, COLLEGE OF ENGINEERING  (513) 556-2933
DR. F. GERNER  ASSOC. DEAN FOR ACADEMIC AFFAIRS, COLLEGE OF ENGINEERING  (513) 556-2739
DR. H. JACKSON  ASSOCIATE VICE PRESIDENT FOR RESEARCH AND ADVANCED STUDIES, U. OF CINCINNATI  (513) 556-4337
MR. RON CUSHING  INTERNATIONAL STUDENT OFFICE, UNIVERSITY OF CINCINNATI  (513) 556-4278
MS. JULIE MUENCHEN  COE AEROSPACE ENGINEERING GRADUATE  (513) 556-0635
MS. BRENDA SMITH  DEPARTMENT OF AEROSPACE ENGINEERING GRADUATE SECRETARY  (513) 556-3548

MAILING ADDRESS:  DEPARTMENT OF AEROSPACE ENGINEERING AND ENGINEERING MECHANICS  P.O. Box 210070  UNIVERSITY OF CINCINNATI  CINCINNATI, OHIO  45221-0070

Aerospace Office Telephone Number:
Voice: (513) 556-3548
Fax:   (513) 556-5038

DEADLINE FOR APPLICATIONS FOR FINANCIAL AID FOR THE FOLLOWING ACADEMIC YEAR IS FEBRUARY 1ST

May 2006
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PREFACE

All graduate students in the Department should familiarize themselves with the contents of this document. It is recommended that graduate students retain the handbook for their personal use throughout their degree program. All students are expected to be thoroughly aware of, and conform to, all the requirements and regulations of the department and university graduate.

A. The Graduate School

The Division of Graduate Studies and Research of the University of Cincinnati is headed by the Vice President for Research and Advanced Studies. The Vice President reports to the President and is responsible for coordinating, implementing and administering all policies, rules and regulations pertaining to graduate degree programs, including those of the Department of Aerospace Engineering and Engineering Mechanics (AsE/EM). It is the role of the Graduate Faculty to determine educational policy of the Graduate Division, regulate admission of students, candidacy and awarding of graduate degrees. The Graduate Faculty has sole power in establishing requirements, but leaves to each individual department the right to determine specific courses of study, precise manners of instruction and individual methods for evaluating the results of examinations. The rules and regulations of the Graduate Division are delineated in the Handbook of the Division of Graduate Studies and Research. Copies of this handbook are available in the department office. Copies have also been distributed to the AsE/EM Faculty and Graduate Student Association. This manual may be consulted for general regulations. The "Graduate Handbook of the Department of AsE/EM" contains all of the policies specific to the Department graduate programs and is in compliance with the rules and policies of the Graduate School.

B. The Department of Aerospace Engineering and Engineering Mechanics

The administrative organization of the Graduate Program in the Department of AsE/EM consists of the following:

1. Director of Graduate Studies

The Director of Graduate Studies (DGS) is appointed by the Department Head. The DGS oversees the smooth operation of the Graduate Program and serves as liaison between the Department and the Vice President's Office. He/she serves as Chairperson of the Department Graduate Committee (DGC). The DGS convenes meetings of the DGC. The Director of Graduate Studies is charged with keeping accurate and timely graduate records for the Department, implementing graduate policy, appointing temporary advisors to students who have not yet chosen a permanent advisor, and certifying students for graduation.

The DGS administers the recruiting and admission efforts of the Department. He/she coordinates the preparation and dissemination of recruiting literature, the correspondence with prospective graduate students, and the processing of all graduate applications.

2. Department Graduate Committee

The Department Graduate Committee (DGC) consists of three department faculty representing each of the three technical areas in the Department: Dynamics & Controls, Fluid Dynamics Propulsion Systems, and Solids & Structural Mechanics. Each Committee member is appointed by the Department Head in consultation with the area faculty and the DGS.

The DGS is the chairperson of the DGC and does not represent his own area. In addition the Department Head is an ex-officio member of the DGC. The President of the Departmental Graduate Student Association acts as a non-voting student representative to the DGC.
The DGS calls regular meetings of the DGC (at least one per quarter) to review graduate student progress and discuss other issues as they arise including requests from any faculty member or graduate student. The DGC deliberates on any issue concerning the Graduate Program, interprets graduate policy and proposes new policy from time to time. The DGC serves as a Departmental Grievance Committee for any and all issues pertaining to the Graduate Program. The DGC also coordinates each Ph.D. qualifying exam. The DGC makes admission and financial decisions.

A quorum for a DGC meeting consists of at least 4 of the voting members. All issues are decided by a simple majority vote of the members present. Any faculty member, graduate student or staff member may request that an item be placed on the DGC agenda or may submit a petition by sending a written request to the DGS. When the issue comes before the DGC, whoever made the request may be asked to appear at the meeting.
3. **Graduate Program Coordinator**

The *Graduate Program Coordinator (GPC)* handles the day-to-day operations of the departmental graduate office. The primary activities of the GPC are:

- Typing all correspondence related to departmental graduate affairs
- Processing all graduate applications for review
- Maintaining departmental graduate database and files
- Interacting with departmental faculty, staff and students and College and University offices (Graduate Studies, Registrar, Personnel, International Student Office, etc.) to resolve student and operational problems
- Interacting with the Manager, Technical Education Programs, General Electric Aircraft Engines and the Director for Education, Ohio Aerospace Institute on matters related to their special programs
- Handling the graduation process for graduate students
- Handling long-distance (voice, FAX, and e-mail) communication with prospective graduate students
- Providing statistics concerning graduate students and applicants

4. **Department Graduate Secretary**

- Assisting with the preparation of the Ph.D. Qualifying Exam
- Assisting with preparation of recruiting materials, and departmental graduate brochures and handbooks

5. **Department Business Officer**

- Handling Personnel Action Forms (PAF) and other paperwork for graduate assistants
I. APPLICATION AND ADMISSION TO GRADUATE DEGREE PROGRAMS

A. Application

1. Process
Application should be made directly to the Graduate School using the on-line system. Applicants should ensure that all application materials are received well in advance of their proposed starting date.

Students are usually admitted for the Autumn quarter of any academic year. However, applications are processed on a continuous basis and in exceptional circumstances admission for another quarter may be granted.

In order to enhance their chances at securing financial aid (stipend and/or tuition remission), applicants interested in such aid should apply prior to February 1.

A tentative four-year calendar appears in Appendix A.

2. Requirements
Admission to the Graduate Program requires a baccalaureate degree (or its equivalent) in engineering, physics, mechanics, mathematics or some other related area. Those having non-engineering degrees should take core courses in engineering early in their graduate program (Appendix B). Applicants are expected to have a minimum undergraduate grade point average (GPA) of 3.0 (out of 4.0). A Graduate Record Examination (GRE) score must be submitted with the application. Flexibility in the admissions criteria will be maintained, and students will be treated individually. In exceptional cases, a student lacking the minimal requirement may be granted admission, on a provisional basis.

3. Types of Admission

a. Full Graduate Standing
Students meeting the minimum criteria for admission are admitted with full graduate standing. These students are eligible for financial aid, if available, and are entitled to all rights and privileges (as well as subject to all regulations) as any other graduate student in good standing.

b. Provisional Admission
Students may be admitted to the Program under special circumstances or with provisional status. This may include such conditions as probation or satisfactory completion of deficiencies. It should be emphasized that these contingencies will be made on a case-by-case basis, that they will last for a stated period of time (usually one academic year), and will be specified in the admission letter. Students may attain full graduate standing when the conditions responsible for their provisional status are corrected, subject to approval of the DGC.

c. Joint Advisors and Interdisciplinary Programs
If a graduate student enrolled in the Department wishes (1) to have a joint advisor in another department, or (2) to carry out his/her thesis research in a laboratory outside the department or (3) to pursue an Interdisciplinary Graduate Program involving the Department of AsE/EM, such arrangements will require advanced approval of the DGC. In all cases, active participation by one or more faculty of the Department of AsE/EM will be necessary.

d. Part-time Study
Students may apply for admission for part-time study. Such students will be eligible to receive a degree from the Department. Domestic part-time students must register for one graduate credit hour per year to maintain their standing in the program. In addition, they must take the AsE/EM
Seminar prior to graduation. A Ph.D. Degree Program may be initiated on a part-time basis to complete course work and qualifying examinations. However, the student must accumulate one academic year residence. All part-time doctoral programs will require the approval of the DGC. A part-time student in good standing will be granted full-time status upon written request to and approval of the Director of Graduate Studies.

e. Unclassified Graduate Student
Unclassified graduate students are admitted to the Graduate Division for study, but not admitted for graduate degree programs. They may take courses for graduate credit, but the number of credits taken under this classification which are accepted for a degree program is at the discretion of the department; ordinarily it will not exceed 15 graduate credits. The only requirement for admission as an unclassified student, or special student, is evidence of a baccalaureate degree (Graduate Faculty 4/14/77).
f. Foreign Student Admission
Foreign students applying to the department for admission must demonstrate evidence of ability to speak and write English. A minimal score of 550 (580 for a Graduate Assistantship) with a score of at least 55 on Part I, on the Test of English as a Foreign Language (TOEFL) is required or a minimal score of 220 on the electronic version of the TOEFL. Alternatively a score of 60 on the Test of Spoken English (TSE) is accepted.

4. Admissions, Advisors, and Financial Aid Decisions

a. Admission
All admissions to the Graduate Program in the AsE/EM Department are competitive and subject to review by the Graduate Committee.

Each applicant will be judged on the basis of:

- Overall grade point average (GPA); GPA in the junior and senior years, GPA in the major area. A value of 3.0 (B) or above is expected in at least one of these.
- Graduate Record Examination (GRE) verbal, quantitative, analytical are required; subject tests are optional.
- At least two letters of recommendation on the supplied forms.
- Official transcripts of all previous baccalaureate and graduate work.
- Departmental faculty interest and available laboratory space or research activity.
- Students originally admitted to the MS Program and wishing to transfer to or continue towards the Ph.D. may request admission to the doctoral program by sending a written request to the DGS. The student’s Advisor and/or the Research Advisory Committee must endorse the request.
- Availability of financial aid, availability of research funds, or evidence that the applicant has financial means to support him/herself.

ADMISSION DECISIONS ARE NOT MADE ON THE BASIS OF AGE, SEX, ETHNIC ORIGIN, RELIGION, SEXUAL ORIENTATION OR PHYSICAL HANDICAP.

b. Advisors
Upon acceptance a student will be assigned a temporary faculty contact. Upon arrival a temporary faculty advisor is given. The temporary faculty advisor may be the same as the temporary faculty contact. Prior to the end of the second quarter after arrival on campus, the student must select a permanent research advisor for MS thesis, MS mini-thesis or Ph.D. dissertation. If an appropriate advisor cannot be obtained in this time frame, a waiver from the graduate office must be obtained. Once a permanent advisor is selected, any change of advisor requires the approval of both the current and new advisors. The student should inform the current advisor of any planned change prior to discussion with a new advisor. A form for this purpose can be obtained from the Graduate Office.

c. Financial Aid
Types of awards and guidelines for graduate awards are described in the Graduate Award Manual published by the Division of Research and Advanced Studies.
i. Types of Support
The Department of AsE/EM has a variety of Assistantships and Scholarships which are awarded to deserving students in support of their graduate education.

- **Graduate Assistantships (GA)** awards provide for full time students a stipend for a nine month period: October 1 through June 30. In addition, a University Graduate Scholarship (UGS) will be awarded to cover the costs of tuition and fees. The value of the stipend will be announced in the award letter. **The University has determined that the stipend should be treated as taxable pay, and federal, state, and city taxes are withheld from the stipend checks.** The duties of the Assistant are an integral part of the Graduate Program, and thus the DGS and/or the Head of the Department of AsE/EM will provide assistance in helping Assistants to recover withheld taxes.

Those students receiving a GA are required to work approximately (19) hours per week for the Department. This includes (9) hours of research on a new or on-going research project and (10) hours of instructional assistance.

These students are also assigned to an Assistantship Advisor. (Usually the Assistantship Advisor is also the temporary Academic Advisor.) Graduate Assistants are expected to participate in the teaching and research functions of the Department, usually helping with the research efforts of his/her Assistantship Advisor, assisting in laboratory courses, grading papers, or possibly teaching a course. Specific department assignments are made each year by the DGS usually in consultation with advisors and students. The specific duties for the research assignment will be given by the Assistantship Advisor.

- In some cases, **Graduate Research Assistantships (RA)**, which are funded from research grants or contracts of individual faculty members, may be awarded. These awards are made by individual faculty members. It is the responsibility of the student to meet with faculty members in the students area of interest to determine the availability of RA positions. The stipend level for RAs will be set by the individual faculty member to a level comparable to that paid to a GA. Students awarded an RA will be eligible to receive a UGS if they satisfy the guidelines for support stated below (Section I.A.4.b.ii) and apply for such an award to the DGS.

- **Departmental Service Assistantship** awards are available periodically and are a part time award. They carry a small stipend and a tuition remission scholarship. This assistantship requires about (8) hours a week of grading, laboratory assistance, research assistance or department service activity.

- A graduate student requesting financial aid may be awarded a **University Graduate Scholarship (UGS)** only. Such awards cover the costs of tuition and all fees except the general fee. If the student is supported on an external grant to the minimum acceptable level, a fee waiver can be requested by his/her research faculty advisor. This must be requested no later than one month prior to the start of any quarter. In addition, if the student is supported by an external grant the award must provide tuition payments at the in-state rate, if the awarding agency permits. A UGS will then be awarded to cover the remaining tuition balance.

The University of Cincinnati and the Department of AsE/EM has available a limited number of **Graduate Scholarships** awarded competitively to eligible students. Information regarding these awards and application requirements will be announced to graduate students each year by the DGS when the information becomes available.

There are several sources of financial aid available on a competitive basis for the Summer. Announcements for these will be made during the Winter and Spring quarters. The **University Research Council (URC)** offers **Summer Fellowships**, with applications
normally due about the end of January. There are also some Summer Research Assistantships available from individual faculty as well as the Distinguished Dissertation Fellowship which is awarded each spring.

ii. Guidelines for Financial Awards
Decisions on awards are based solely on academic potential as indicated by credentials for new students or by actual performance in the case of continuing students. The guidelines below are followed by the DGC when awarding financial aid.

• Initial awards are for one academic year. Support for a second year is based on the student's academic performance. Those with a GPA of less than 3.0 during the first year will not be considered for support of any kind during the second year.

• Further support will depend on the availability of aid, the student's academic performance, teaching or research performance, and normal progress towards the degree (2 years for MS and three years beyond the MS for the Ph.D.). The student must meet with his/her advisor at least once every year to complete a performance review form. This form must be signed by the advisor and transmitted to the DGS. This form is required if further support of any kind is requested. The meeting is also an opportunity for the student to discuss any academic, research or other problems or issues.

• Graduate Assistantship (GA) support is generally offered to incoming students only. Except for special terminal PhD awards, a student will not receive GA support past the second year of study in the AsE/EM department. It is expected that further financial aid will be as a research assistant supported by the student's major advisor. The student should make arrangements with his/her advisor for any financial support during summer quarters or beyond the second year of graduate study.

• Financial aid is not normally terminated during the period for which it has been granted. However, for serious reasons such as poor academic performance, teaching or research duties, or moral turpitude, a dismissal hearing by the DGC may be convened. If the dismissal hearing warrants it, the DGC may terminate prematurely a student support.

• International students who are interested in teaching assignments must pass the Oral English Proficiency (OEP) Test. This exam must be taken twice during each year of study by all International students for whom English is not the native language until it is passed. The special course in English for the OEP exam is allowed for graduate credit and can be applied toward the (15) UGS credit hours.

• Under ordinary circumstances, tuition scholarships will not be awarded to students who have attempted 260 or more quarter hours. Students with master’s degrees from other institution will not be eligible for tuition scholarships after attempting 209 quarter hours at our University.

Beginning Academic Year 2004-2005 the University changed its policy toward tuition scholarships. The policy now permits tuition scholarships for only degree related courses. That is, students may be awarded a UGS only if they require credits for the completion of a degree. In addition, a tuition scholarship can still only be awarded for full-time study. This policy requires students to pay careful attention to their workload and work to graduate in a timely manner.

In the Winter quarter of each academic year, the DGS will send an announcement to all graduate students asking if they wish to be considered for financial support for the following academic year. All awards are made on a competitive basis. Students who currently do not hold financial...
aid will also be considered at this time. Only students requesting aid, in writing before March 1st, will be considered by the Graduate Committee with entering students for the coming year and other renewal candidates. Students applying after this date will be considered if there are remaining funds available. A letter will be sent before the end of the Spring Quarter notifying the student of the award decision. The Annual Progress Review is required for continuing students.

In reviewing the request, the Graduate Committee will proceed as outlined below:

- The members of the DGC will meet to review the student requests and the recommendation of the advisor. It will decide, by a majority vote of the members present, whether each student will be awarded financial support for the coming academic year.

- For all doctoral students, the advisor will provide a written assessment of performance at the end of the year. This is part of the annual review. This evaluation will be used by the DGC in making award decisions.

- In the event that the decision of the DGC is negative, the student may appeal the decision within one week of notification. The appeal must be made to the DGC, by sending a written request to the DGS. The student and/or his/her advisor will be allowed to present information in person on behalf of the student. The DGC will decide by a majority vote of the members present whether to uphold or rescind the earlier decision. The results of the vote will be final.
B. Pre-Registration Procedures and Requirements

1. Supplementary Information Form

The supplementary Information Form must be completed prior to registration by the following individuals:

- new students entering the University,
- students not enrolled in the previous academic year,
- students who transfer to another college, or
- students who have earned their Masters’ degrees and are admitted to the Department's Ph.D. programs.

2. Physical Examination

A physical examination is required of each applicant. A tuberculin Tine test or chest x-ray is required within three months of registration.

3. Transfer of Credits

As a means of assuring that the character and standards embodied in graduate degrees awarded by the University of Cincinnati are preserved, limits are set on the amount of work completed at other institutions which can be included as fulfilling graduate degree requirements. Transfer of credits from other universities, summer programs, etc., are subject to the approval of the student's Advisor and the Director of Graduate Studies. Limits are as follows:

a. Master's Degrees.

The minimum requirement for these degrees is one year's full-time graduate study, or it's equivalent. Eligibility for graduation requires a minimum of forty eight (48) graduate credits for a thesis or a non-thesis program, the latter half or (15) of which must be completed while in residence at the University of Cincinnati. Three (3) credits for the departmental seminar is included in the (48) credits total (see GE students for an exception). The M.S. thesis is fifteen (15) credits. A student who has previous graduate work at another institution that has not been used towards a degree may petition the DGC to transfer up to (9) quarter credit hours of relevant course work with grades of ‘B’ or better. Total out of the department courses are still limited to section c.

b. Doctoral Degrees.

These degrees are conferred on the basis of extensive study and high scholarly attainment in a special field of learning. In no case, however, will the degree be granted for less than three years of full-time graduate study or its equivalent, of which the last year must be in residence at the University of Cincinnati or under the University's direction. Eligibility for graduation requires a minimum of (138) graduate credits, the last (45) of which, exclusive of research credits, must be completed at the University of Cincinnati. One (1) credit for the departmental seminar is included in the (138) credits total. A student who enters the department with a MS degree may be credited with a maximum of (45) credits, of which a maximum of (30) course credits may be from another university. In addition, a maximum of (15) research credits can also be transferred.

c. Out of Department Course Limits

MS students are allowed to take 9 credit hours of coursework outside of the ASE/EM department. The 9 credit hours do not include any Math courses needed to meet the degree math requirements. PHD students who have an earned MS degree are allowed to take 12 credit hours of their PHD coursework outside of the department. The 12 credit hours do not include any math courses needed to meet the degree math requirements. PHD students who choose not to earn an MS
degree are allowed to take 21 credit hours of coursework outside of the department. The 21 hours do not include any math courses needed to meet the degree math requirements.
II. REGISTRATION

A graduate student must be registered in the Graduate Division in order to earn graduate credit. However, unclassified students may be eligible to apply specific course credits towards their degree if later admitted into the Graduate Program (see Section I.A.3.e above).

A. Registration Procedures

A student who has applied to, and has been admitted by, the Graduate Division registers each quarter by securing registration materials from the appropriate administrative unit, seeking counsel from his/her Advisor and obtaining his/her approval (signature), properly completing and processing registration materials, and promptly making full payment when billed. A student may not attend classes until registration is completed. A Graduate Student receiving support is required to register for (15) graduate credits in the Autumn and Summer quarters. 12 credits is the minimum full time load. Registration for courses that will not be included in your Program of Study, requires written approval from your ASE/EM Advisor or this can result in termination of your UGS. An updated Program of Study must be on file in the Graduate Office at all time.

The Department of Aerospace Engineering and Engineering Mechanics has two (2) approved codes to identify which program the student is enrolled in:

<table>
<thead>
<tr>
<th>Program</th>
<th>Code</th>
</tr>
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<tbody>
<tr>
<td>Aerospace Engineering</td>
<td>AEEM</td>
</tr>
<tr>
<td>Engineering Mechanics</td>
<td>ENGM</td>
</tr>
</tbody>
</table>

The student should insert the appropriate code number on his/her registration form.

B. Registration Change Procedure (Drop/Add)

Once a student has completed registration, the official record can be changed only with a registration change form (Drop/Add) secured from the student's college office, to be used only when changes in a program are absolutely necessary. Such changes can be made in the regular registration period without charge. Beginning on the first day of classes of any academic period, a service fee is charged for all changes involving addition of a course, change in course section change from graduate to undergraduate credit change from credit to audit or vice versa, regardless of the reason. Such changes must be processed through the Office of Registration and scheduling by Friday of the second week of classes, unless the college offering the course has established an earlier deadline. After Friday of the second week of the quarter, course drops will be accepted. See Section II.E.1 for complete course withdrawal rules.

C. Audit Regulations

The audit option is intended for cases in which course work is desired or advised but in which a grade is deemed unnecessary by the student in consultation with the Advisor. Admissions and conditions for participation in audit courses are at the discretion of the instructor, who is not obligated to accept a student for audit. Audited courses cannot be used to satisfy any graduate degree course requirements. An example of where an audited course may be appropriate would be for a student doing field work in a foreign country where a working knowledge of the language is needed.

Audit hours may not be charged to a UGS unless (12) graduate credits are taken that same quarter (and if the total is less than 19 credits). Also, no more than one audit course per quarter may be charged to a UGS.
D. Pass/Fail

A graduate student may not take courses for graduate credit on a pass/fail basis, except when approved by the Advisor. The pass/fail option is limited to research, seminars or courses outside the requirements of the graduate program (e.g. deficiency credits, extra-departmental electives). Under no circumstances may a course taken pass/fail be counted towards fulfilling a graduate degree course requirement.

E. Withdrawals

1. Academic Consideration

For withdrawals on or before the third Friday of the quarter, the grade of "W" is assigned by the Registrar's Office and the course is deleted from the student's official record. For withdrawals after the third Friday and on or before the sixth Friday, the grade of "W" is required to be assigned by the instructor. For withdrawals thereafter, the instructor is required to submit a grade of "W" for students whose work has been of passing quality, and "F" for students whose work has been failing quality up to the time of withdrawal.

   No withdrawal is permitted after the eighth Friday of any quarter.

Exceptions to this rule will be with the approval of both the advisor and the Associate Dean for Graduate Studies and Research and will require both detailed and adequate justification.

Every withdrawal slip must be signed by the student's academic advisor. The advisor's signature is required so that the advisor is aware of the student action, and to advise the student of possible academic, fiscal, or visa problems. (Full time graduate students must carry at least (12) graduate credits but are encouraged to take (15) graduate credits, exclusive of audits. A withdrawal which brings the student below that level places UGS support in jeopardy. The student will then become liable for the quarter's tuition. International students must maintain full time status.)

A student may be withdrawn by the instructor at any time in the quarter when excessive absences have been incurred. A student who withdraws due to excessive absences is not eligible for academic credit, refund of fees, or reinstatement as an auditor in that course.

2. Leave of Absence

Students may request a leave of absence from the program, for a period of up to one year, for medical, financial, or personal reasons. Such requests must be made in writing to the DGS and must be endorsed by the student's advisor. Upon return to the program the student's status will be the same as when he/she started the leave. Students, however, are cautioned that, if they had financial aid at the time of the leave, there is no guarantee that aid will be available when they resume their studies at the end of the leave.

Unofficial leaves of absence or vacations during the academic year may not be taken. Students who do so may have their financial aid withdrawn and/or may be placed on probation or dismissed from the program by the DGC.
III. GRADUATE CREDITS AND GRADING PRACTICES

A. Full-time and Part-time Course Load

Unless specifically admitted as a part-time student, all graduate students are expected to carry a minimum of (12) graduate credit hours (courses at the 600 level and above) per quarter for Autumn, Winter and Spring quarters. Students do not have to register for Summer quarter to maintain their full-time status. Students taking courses for audit must still take an additional (12) graduate credit hours. The recommended course load is (15) graduate credit hours per quarter. Students admitted as full-time students may request part-time status by submitting a written request to the DGS. Approval of part-time status may not be automatic, however.

Credit can be earned for only those courses in this University listed in the current Learning Opportunities/Courses of Instruction of the Graduate Division.

Most foreign students, under the terms of their visas, must be enrolled as full-time students.

B. Graduate Assistants and University Graduate Scholarship Recipients

Any students receiving a GA, RA or UGS must carry a full credit load each quarter (at least 12 graduate credits, exclusive of audit credits).

Full-time students who have received a UGS or GA are required to register for (15) hours during the Autumn and/or Summer quarters and are encouraged to register for (15) hours during the other quarters.

The Ohio Board of Regents denies state subsidy for graduate students who have earned more than 260 graduate credit hours. Graduate students whose graduate credit hours at the University of Cincinnati exceed 260 are not eligible for financial aid from general funds (UGS and GA).

C. Graduate Credit in 600 and Above 600 Level Courses

The College of Engineering has a (5) year cooperative undergraduate program. Therefore, courses designated at the 100 through 500 levels are strictly undergraduate courses. Courses at the 600 level are called "Dual Level Courses". They are primarily graduate level, but may be taken by Engineering Seniors as technical electives. When requesting a 600 level courses, the student must specify if it is for graduate or undergraduate level. Courses from the 700 through 900 levels are strictly graduate courses.

Usually, only College of Engineering courses at the 600 level for graduate credit and courses from 700 through 900 levels may be used on a graduate program. Courses from other Colleges at the 500 level or above may be used on a graduate program however.

D. Grading Practices

The department of AsE/EM uses the grading practices specified in the Handbook of the Division of Graduate Studies and Research. If a student receives a grade of F in a course, the student must retake the course or its approved equivalent. Upon receiving a grade of A, B, or C after retaking the course, the F grade will still be considered in calculating the student's grade point average.
IV. MASTER'S DEGREE PROGRAMS

A. Types of M.S. Programs
The Department of AsE/EM offers courses of study leading to the Master of Science degree in both Aerospace Engineering and Engineering Mechanics. Each of these two M.S. Programs offer a Thesis and a Non-Thesis Option. The requirements for the Aerospace Engineering Program and the Engineering Mechanics Program are different. In each Program, the requirements are also different for the Thesis and the Non-Thesis Options.

B. Program Requirements

1. Aerospace Engineering

MASTERS OF SCIENCE IN AEROSPACE ENGINEERING
ALL MAJORS

<table>
<thead>
<tr>
<th></th>
<th>THESIS</th>
<th>NON-THESIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Option</td>
<td>15 cr. hrs.</td>
<td>18 cr. hrs.</td>
</tr>
<tr>
<td>Technical Electives</td>
<td>9 cr. hrs.</td>
<td>12 cr. hrs.</td>
</tr>
<tr>
<td>Mathematics</td>
<td>6 cr. hrs.</td>
<td>6 cr. hrs.</td>
</tr>
<tr>
<td>Minor Option</td>
<td>--- NA ---</td>
<td>6 cr. hrs.</td>
</tr>
<tr>
<td>Thesis</td>
<td>15 cr. hrs.</td>
<td>--- NA ---</td>
</tr>
<tr>
<td>M.S. Mini Thesis</td>
<td>--- NA ---</td>
<td>3 cr. hrs.</td>
</tr>
<tr>
<td>Seminar</td>
<td>3 cr. hrs.</td>
<td>3 cr. hrs.</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>48 cr. hrs.</td>
<td>48 cr. hrs.</td>
</tr>
</tbody>
</table>
2. **Engineering Mechanics**  

<table>
<thead>
<tr>
<th>MASTERS OF SCIENCE IN ENGINEERING MECHANICS</th>
<th>ANALYTICAL MECHANICS MAJOR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>THESIS</td>
</tr>
<tr>
<td>Dynamics and Control</td>
<td>15 cr. hrs.</td>
</tr>
<tr>
<td>Fluid Dyn. and Propulsion Systems</td>
<td>{</td>
</tr>
<tr>
<td>Solid Mechanics</td>
<td>3 in ea. area</td>
</tr>
<tr>
<td>Mathematics</td>
<td>9 cr. hrs.</td>
</tr>
<tr>
<td>Technical Electives</td>
<td>6 cr. hrs.</td>
</tr>
<tr>
<td>Thesis</td>
<td>15 cr. hrs.</td>
</tr>
<tr>
<td>M.S. Mini Thesis</td>
<td>--- NA</td>
</tr>
<tr>
<td>Seminar</td>
<td>3 cr. hrs.</td>
</tr>
<tr>
<td>Total</td>
<td>48 cr. hrs.</td>
</tr>
</tbody>
</table>
3. Notes for Both Programs

a. Program of Study
The student must arrange a program of study in consultation with a temporary advisor during the first two months of the quarter in which the student first enrolls. A copy of the program of study must be provided to the Graduate Office. The student must select a permanent advisor by the end of the second quarter after admission. If necessary the program of study should be revised and a copy given to the Graduate Office. Future financial support may depend on the completion of the program of study. Classes not included on the program of study will not be counted toward the student’s degree unless the Program of Study is amended and signed by the advisor. Course not in the program of study and not approved by the advisor may result in termination of financial aid.

b. Petitions
If a student wishes to petition from department rules, they must have signed approval from their advisor and their Graduate Committee representative prior to submitting the petition to the Department Graduate Committee.

c. Reading Courses
M.S students may take up to one 3-credit-hour Reading Course as approved by his/her advisor. PhD students may take an additional six credit hours of Reading Courses as approved by his/her advisor.

d. Seminar Requirement
Department rules specify that three (3) graduate credits for seminar is required at the M.S. and PhD level. Registration for the seminar is for three quarters, generally the quarters of the first year during which the student first registers. A grade of "P" is assigned at the end of each quarter when the Seminar is completed successfully. Students must attend all seminars each quarter. For part-time students this seminar requirement may be spread over several academic years. For the GE-ACE/ACM students this requirement is relaxed to 2 credits. In exceptional cases where conflicts or other business preclude attendance to the seminars, the seminar director should be notified and suitable alternate arrangements be discussed.

e. Major Requirements
The following courses must be included in each AsE/EM major option course requirements.

AEROSPACE

i. Dynamics and Controls
20-AEEM-603 Analytical Dynamics I
20-EGFD-615 Introduction to Modern Control Theory

In addition, 3 (thesis) or 4 (non-thesis) formal, non-research, 3 cr. Hr. courses at the 600 level or higher in the Dynamics & Controls area. These can include AEEM 604 Analytical Dynamics II, EGFD 622 Optimal Control, AEEM 636 Spacecraft Dynamics, AEEM 693 Advanced Flight Mechanics, AEEM 695 Orbital Mechanics I, EGFD 690 Optimization in Engineering Design, and/or any other graduate-level departmental or EGFD courses in the area of Dynamics & Controls. Selected courses from other departments in the Dynamics & Controls area are also acceptable.

ii. Fluid Dynamics and Propulsion Systems
20-AEEM-641 Introduction to Compressible Flow
20-AEEM-676 Heat Transfer for Propulsion Systems
20-AEEM-930 Advanced Propulsion I
20-EGFD-631 Introduction to Combustion Theory
20-EGFD-741 Viscous Laminar Flow
iii. **Solids and Structural Mechanics**

20-EGFD-701 Engineering Elasticity I

Plus at least three of the four courses listed below:
- 20-EGFD-601 Advanced Strength of Materials
- 20-AEEM-681 Mechanics of Structures
- 20-EGFD-702 Engineering Elasticity II
- 20-EGFD-705 Finite Element Techniques I

Note: 20-EGFD-706 Finite Element Techniques II can be substituted for Finite Element Techniques I if the student has sufficient background.

**ENGINEERING MECHANICS**

i. **Engineering Mechanics: Analytical Mechanics**

20-AEEM-603 Analytical Dynamics I
20-EGFD-741 Viscous Laminar Flow
20-AEEM-683 Continuum Mechanics

Recall that the number of credits outside the Department is limited. (see page 12)

vii. **Other Majors**

Students may elect to choose a major in an alternate area with a petition to the DGC. Recall that the number of University of Cincinnati credits outside the Aerospace Engineering/Engineering Mechanics Department is limited. (see page 12) Additional modification to programs may be requested by petition to the Department Graduate Committee.

f. **Minor Requirements**

The following courses must be used to satisfy the six (6) credit minor option requirement.

i. **Dynamics and Controls**

Six (6) credits in the general area of Dynamics and Controls

ii. **Fluid Dynamics and Propulsion Systems**

Six (6) credits in the general area of Fluid Dynamics and Propulsion Systems

npinto@alpha.che.uc.edu

iii. **Solid and Structural Mechanics**

Two courses in any combination from the following list:

- 20-EGFD-701 Engineering Elasticity I
- 20-EGFD-601 Advanced Strength of Materials
- 20-AEEM-681 Mechanics of Structures
- 20-EGFD-702 Engineering Elasticity II
- 20-EGFD-705 Finite Element Techniques I
- 20-EGFD-706 Finite Element Techniques II

Recall that the number of University of Cincinnati credits outside the Department is limited. (see page 12)

vi. **Other Minors**

Approved AsE/EM fundamental major and minor options are: Analytical Mechanics, Biomechanics, Dynamic and Controls, Fluid Mechanics, Propulsion and Thermal Sciences, Solids and Structural Mechanics. Students may elect to choose a six (6) credit minor in an alternate area such as Wave Mechanics, Computer Science, Vibrations, Heat Transfer, etc. with a petition to the
DGC. Recall that the number of credits outside the Department is limited. (see page 12) Additional modification to programs may be requested by petition to the Department Graduate Committee.

g. Mathematics Requirement
Graduate mathematics courses are generally taken from mathematics numbered courses in the College of Engineering level 600 or above or the Physics or Math Department 500 and above. Your advisor should approve these courses. In some cases appropriate mathematics courses can be found in other departments such as Computer Science, etc. Your advisor and the Department Graduate Committee must approve these courses. A list of already approved courses is on file in the graduate office.

h. Special Rules for UC/GE ACE/ACM M.S. Programs
A UC/GE ACE/ACM program participant can apply fifteen (15) credits of Advance Standing from the GE A and B courses to the M.S. program in any manner consistent with the following:

- From the contents of the A and B courses, three (3) credits can be applied to the mathematics requirement and nine (9) credits to technical electives. The remaining three (3) credits can be applied to technical electives or to an AsE minor or any of the requirements in the EM program as specified below:

  Fluid Dyn&Prop. Sys: Any approved three (3) credit course at UC can be replaced.
  Dynamics & Control: Only Fundamentals of Control can be replaced
  Solids and Struc. Mec: Only Continuum Mechanics can be replaced.
C. Minimum Academic Performance

The Handbook of the Division of Graduate Education and Research states that graduate students must receive a minimum grade of a "C" or "P" in all course work to receive graduate credit. In addition, 2/3 of the minimum graduate credits necessary for the degree must be at a level of B or higher.

The Department of AsE/EM also has established the following requirements:

A Master's degree student must achieve an overall average of B on all graduate coursework. A student in the AsE/EM Department may be dismissed if his/her overall technical coursework GPA falls below 3.0.

If coursework is repeated all grades of a repeated course count toward these requirements.

Graduate student's grades will be reviewed by the DGC once they become available after the end of each quarter. All graduate students with grade deficiencies will be notified by the DGS and reminded of the above requirements.

D. Candidacy

Students are not required to submit a formal application for Master's candidacy. A student becomes a candidate for the Master's Degree upon matriculation in the Master's Program in which he/she has been admitted. To maintain status as a graduate student and thus be eligible for a graduate degree, students must register for at least one (1) credit each academic year during the Autumn Quarter. (See Section II.E on withdrawals and leaves.) International students must register for at least one (1) credit hour each quarter.

E. Time Limitations

The minimum requirement for the Master's Degree is the equivalent of one academic year of full-time graduate study. The Handbook of the Division of Graduate Education and Research states that a student pursuing a program leading to a Master's Degree must complete all requirements no later than seven (7) years from the date of acceptance in that degree program.
F. Research Projects, Thesis and Examinations

1. Thesis Research Projects
A student electing a thesis Master's Degree will select a research advisor and a Research Advisory Committee (RAC). The committee normally consists of the research advisor and at least two other appropriate representatives, see University Graduate Handbook for more details. The student will then select a research project in consultation with the research advisor and with approval of his/her Research Advisory Committee (RAC). The advisor and the RAC have the responsibility to see that the project is carried out under currently accepted scientific standards. Upon completion of the research, a thesis will be prepared and defended orally in public. A grade of “P” should be given if applicable.

2. Thesis Preparation
The University Graduate Handbook provides graduate degree candidates with detailed information concerning the written/electronic form of the thesis and the mechanics of preparing the final draft and abstract. Regulations regarding electronic submission are also available from that office. These are reproduced below:

Submission of Thesis

A thesis has been approved, the candidate for the master’s degree will be required to follow the thesis submission procedures detailed on the Graduate School website at [www.grad.uc.edu](http://www.grad.uc.edu), “Graduation,” “Submitting your Thesis or Dissertation,” or on the [www.etd.uc.edu](http://www.etd.uc.edu) website. A brief overview of the process is provided below, but students are responsible for reviewing the most current and detailed instructions on the website referenced above.

The student must submit the following to the Office of Advanced Studies in an 8½” x 11” brown manila envelope:

- One electronic file in PDF format of the thesis and the text-only/plain-text file abstract. This abstract must be approved by the students advisory program and shall consist of not more than 150 words.
  - The student is responsible for any conversion of formulas and characters when the abstract is saved in a text-only file.
- Two original approval forms with original signatures on each, downloaded on acid-free paper from the graduate website at [www.grad.uc.edu](http://www.grad.uc.edu), “Graduation,” “Submitting your Thesis or Dissertation,” “Committee Approval Form.”
- Copyrighting of the thesis is optional through Bell and Howell/UMI. If copyrighting is desired, the $45 fee is paid at the University Cashier’s Office, and the receipt is submitted to Advanced Studies. A student who wishes to copyright through Bell and Howell/UMI must also be published through Bell and Howell/UMI for an additional $45 fee paid at the Cashier’s Office.
- Embargo Form, completed and signed.

It is the responsibility of the student to see that he/she is in compliance with these regulations.

3. Thesis Defense
Prior to graduation, the thesis student will give an oral defense. In this defense the student will give a 30 to 45 minute presentation of his/her thesis to the RAC. After the thesis presentation, the student will be questioned by the committee on both the thesis, and the subject matter related to the thesis topic. Successful completion of this defense and the courses required in this program plus electronic submission of the thesis (in accordance with the rules of the Engineering College) constitute completion of the requirement for the Masters degree.

If the defense is failed, the student may repeat the defense at a later date to be arranged through his/her Advisor. A second failure of the defense is disqualifying.
The final version of the M.S. Thesis ready for binding must be submitted to the Office of Vice President for Research and Advanced Studies later than the published date.

G. Final Experience
No student may complete a graduate degree by only taking formal classes. A final experience, the nature of which is to be established by each department, is required. A MS thesis or Ph.D. dissertation, along with the oral presentation, constitutes a final experience. Therefore, only a Non-Thesis M/S. program needs a special final experience.

The AsE Department has established the following method for obtaining final experience in a Non-Thesis M.S. program. The student must do a (3) credit project known as a "mini-thesis". The mini-thesis will be supervised by a committee including the Advisor and at least one additional faculty member. The student must have written approval from the mini-thesis committee and submit this approval to the DGC. The student must register for (3) credits of 20-251-970, Research under the appropriate mini-thesis Advisor section number.

This project may be: (1) an extensive review of a technical paper or other technical work, (2) a "state of the art" review in a specific technical discipline, or (3) any other appropriate investigation as approved by the mini-thesis committee. The procedure to be followed by the student is:

- Determine a faculty member who will serve as mini-thesis Advisor.
- Register for three credit hours for the course 20-251-970 Research (under the appropriate section for the chosen mini-thesis Advisor).
- Within four weeks after registration the student will prepare a one page proposal describing work to be performed under this project. This is to be approved by the student's mini-thesis committee. The committee will consist of the Advisor and at least one additional member of the faculty.

The result of this project is to be a written (typed) report submitted to the committee. If approved by the committee, the Advisor is to register a grade of "P" for the project. If any dispute arises as to satisfactory completion of a project, the DGC as a whole can act to approve or disapprove the project. A copy of the approved final project should be forwarded to the DGS.
H. Graduation
Upon successful completion of the mini-thesis or thesis defense, the Research Advisor will forward a letter to the Director of Graduate Studies certifying that the student has completed all requirements for the degree. The letter must be accompanied by a duplicate copy of the front page of the mini-thesis or thesis, signed by the members of the Research Advisory Committee and a completed "Certification For Graduation Form". The DGS will sign the form and forward it to the Graduate Dean.

Each student who has successfully completed all requirements for any of the Master's Degree Programs in the Department of AsE/EM should apply to the office of the Division of Graduate Education and Research for graduation. It is the responsibility of the student to insure that all forms, procedures and regulations required by that office for graduation are fulfilled. See of the University Graduate Handbook, Chapter 6, Graduation for these requirements.
V. DOCTORAL DEGREE PROGRAM

A. Course of Study
The Department of AsE/EM offers courses of study leading to the PhD degree in both Aerospace Engineering and Engineering Mechanics. The requirements for the Aerospace Engineering Program and the Engineering Mechanics Program are similar. Three majors are available in the Aerospace Engineering Program: Dynamics and Controls, Fluid Dynamics and Propulsion Systems, and Solids and Structural Mechanics. Majors available in the Engineering Mechanics Program are Dynamics, Fluid Dynamics, and Solids and Structural Mechanics. Each of these can also serve as minor subject areas. Students may elect to choose six (6) credit hours of a minor in an alternate area with a petition to the Graduate Committee.

A prospective candidate for the doctorate follows a plan of full time study that ordinarily lasts three (3) years beyond a Master’s Degree.

• The first year of study is generally directed toward completing most of the course work in the major area of study and mathematics, and passing the PhD Qualifying Examination.
• The second year of study is generally aimed toward completing all course work, initiating a dissertation research project, and completing the PhD Dissertation Proposal.
• The third year and any subsequent years of study, is generally focused on completing the dissertation and the foreign language requirement.

All full-time and part-time students who earn their M.S. degree in the AsE/EM Department and who wish to continue their studies toward the Ph.D. degree must petition to the DGC for admission to the Ph.D. Programs.

Immediately upon a student's declaration of intent to pursue registration and study leading towards the Ph.D. degree, an advisor will be selected by the student subject to the approval of the DGC. The faculty member selected must be from the option in which the student wishes to major. The faculty advisor will usually become the Dissertation Advisor and assist the student in the formation of a Dissertation Committee once the student has passed the qualifying exam (see Section V.G below). A Ph.D. Dissertation Proposal, duly signed by the Dissertation Committee, must be submitted to the Graduate Committee for approval no later than one year prior to graduation (see Section V.G below).

The Dissertation Committee, together with the student, will prepare the student's program of study and submit it to the DGC for their information and review. The student and his/her committee will endeavor to draft a program with a central emphasis on some option in Aerospace Engineering or Engineering Mechanics with mathematics and some other option in this or another appropriate department in a supporting role (i.e. one major and two minors).

An important function of the Dissertation Committee is to supervise the study program of the student. The student may request a meeting with the Dissertation Committee when there is an important academic matter to discuss.

B. Credit Hours Requirements
A student is required to satisfactorily complete a minimum of (135) quarter credits beyond the Bachelor's degree and a minimum of (90) quarter credits beyond the Master's degree requirements, whichever is greater. Work in the major option should represent at least (36) credit hours of study beyond the Bachelor's degree, not counting credits for thesis and dissertation, and with at least (18) credits in 700 level or above courses. One minor of (12) credits, (15) credits of Mathematics hours, (12) credits of technical electives, plus (60) credits of research, with at least (45) credits of Ph.D. Dissertation Research are also required. (See page 11). Three credits for registration in the Department seminar after M.S. degree, is not included in the above total. These requirements are summarized below.
DOCTOR OF PHILOSOPHY IN AEROSPACE ENGINEERING
OR ENGINEERING MECHANICS

<table>
<thead>
<tr>
<th>Option</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Option</td>
<td>36 cr. hrs. with at least 18 cr. hrs. in 700 level or above courses</td>
</tr>
<tr>
<td>Minor Option</td>
<td>12 cr. hrs.</td>
</tr>
<tr>
<td>Mathematics</td>
<td>15 cr. hrs.</td>
</tr>
<tr>
<td>Technical Electives</td>
<td>12 cr. hrs.</td>
</tr>
<tr>
<td>Ph.D. Research</td>
<td>60 cr. hrs. with at least 45 cr. hrs. in PhD Dissertation Research</td>
</tr>
<tr>
<td>Seminar</td>
<td>3 cr. hrs.</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>138 cr. hrs.</strong></td>
</tr>
</tbody>
</table>
C. Minimum Academic Performance

The *University Graduate Handbook, Chapter 4, Graduate Credit Policies* states that graduate students must receive a minimum grade of a "C" or "P" in all course work to receive graduate credit.

The Department of AsE/EM also has established the following requirements:

A doctoral student must maintain an overall Grade Point Average (GPA) of 3.0 or greater on all graduate coursework as well as a 3.0 or greater GPA for coursework in their major area of study. A student in the Aerospace Engineering or Engineering Mechanics degree program may be dismissed if his/her coursework GPA falls below 3.0.

Coursework is defined explicitly to exclude research credits and seminar, since they are exclusively graded on a Pass/Fail basis.

If coursework is repeated, all grades of a repeated course count toward these requirements.

Graduate student's grades will be reviewed by the DGC once they become available after the end of each quarter. All graduate students with grade deficiencies will be notified by the DGS and reminded of the above requirements.

D. Residency

The *University Graduate Handbook, Chapter 7, Residency* stipulates that all doctoral students must meet a residency requirement. A minimum requirement would consist of enrollment for at least 10 graduate credits during each of three quarters out of five consecutive quarters, including the summer quarter(s) so long as the student registers for at least (12) hours in each autumn quarter involved.
E. **Ph.D. Qualifying Examination**

All doctoral students in the Department of Aerospace Engineering and Engineering Mechanics are required to pass a candidacy examination, hereafter referred to as Ph.D. Qualifying examination, in accordance with the rules and guidelines of the *University Graduate Handbook, Chapter 7, Candidacy*. In order to take the exam a doctoral student must meet or exceed the Minimum Academic Performance rules discussed in Section V.C of the *Department Graduate Handbook*. In addition, the student can have no more than 2 I/NG grades.

Passing the exam is only one of the requirements for candidacy (see *University Graduate Handbook, Chapter 7 and Section V.* below).

The Ph.D. Qualifying Examination will consist of two parts: a written examination and an oral examination to be given only after passing the written examination. The objective and examination grading are based on the student’s:

1. Understanding of engineering concepts and ability to apply these concepts in research and design.
2. Ability to critically analyze an engineering problem
3. Ability to organize and communicate a body of knowledge
4. Ability to answer questions related to a defined body of knowledge.

**IT IS EXPECTED THAT THE STUDENT SHOULD SHOW A THOROUGH UNDERSTANDING OF UNDERLYING PHYSICAL AND MATHEMATICAL CONCEPTS, AND DEMONSTRATE THE ABILITY TO SUCCESSFULLY COMPLETE AN ORIGINAL RESEARCH DISSERTATION.**

Any Graduate student, whether holding a MS degree or not, who has declared his/her intention to pursue a Ph.D. degree is a Doctoral student and as such is required to pass the Ph.D. Qualifying Examination and is subject to the requirements of this Section.

1. **Time Requirements**

   The Ph.D. Qualifying Examination is given twice a year, normally in the middle of the Autumn and Spring quarters.

   A student entering the doctoral program must pass the exam no later than two years after his/her entrance into the Ph.D. program. A student may not take the Ph.D. Qualifying Exam more than two times and may be denied a retake due to poor performance on the first try (see Section 4, Part C below), or if this retake would violate the above time requirements. (This paragraph amended 10/21/2004.)

   In exceptional cases the time requirements specified above may be waived upon petition to the Graduate Director (see Section 2 below).

2. **Petition Requirements**

   A student wishing to depart from the time requirements noted above must notify the Department Graduate Committee by petition of his/her intentions. This written petition, detailing the reasons for the departure, must be received and approved prior to the scheduled exam.

   A student wishing to take the Qualifying Examination in the Fall or Spring quarter must notify the Department Graduate Office, utilizing the form provided by that office, of his/her intention before the posted deadline (generally three weeks before the exam date). On the form, the student must indicate his/her major area and must secure the signature of a faculty member who has agreed to act as the student’s dissertation advisor after the student has passed the examination.

   Approved AsE/EM major areas of study are (1) Dynamics & Controls; (2) Fluid Mechanics & Propulsion Systems; or (3) Solids & Structural Mechanics.
3. **Special requirement for foreign students**

Foreign students subject to TOEFL requirements are strongly urged to pass the Oral English Proficiency Exam before taking the PhD Qualifying Examination because of the language skills required for the oral portions of the exam.

4. **The Ph.D. Qualifying Examination**

All students who apply for the Ph.D. Qualifying Examination will have access to prior exam questions, although not necessarily to solutions, from at least the prior two years. Each major area provides to the Graduate Office a list of Qualifying Examination topics that the exam may cover. Faculty in each of the major areas maintains these topic lists. The Graduate Office will provide the latest topic list available from each group on-line.

The exam shall consist of a written part and an oral part. The oral is taken only if a passing grade is achieved on the written part.

**a. Written Exam**

The written examination is an eight-hour, open-book examination consisting of four questions, with three questions in the major area of study and one question in mathematics relevant to the major area of study. All questions will be prepared and graded by faculty members in the major area of study. A passing grade on at least three of the four questions is required to pass the written portion of the qualifying examination. For any question that is failed, the faculty member will provide to the Graduate Office a written justification for the failing grade. (This paragraph amended 10/21/2004.)

**b. Oral Exam**

Prior to the oral examination, the student will meet with his/her potential dissertation advisor to define a specific topic in the student’s major area of interest and to identify appropriate source material for an oral examination. This material will consist of seminal literature from books, journal articles, and conference proceedings that are related to the student’s major area of study and to the student’s intended doctoral research area.

Following passage of the written examination the student will prepare for the oral seminar and examination. The student must schedule the oral examination as described below.

The student will first distribute a double-spaced, typed review of the literature to be presented in the seminar. It should be kept in mind that additional background information might be needed to fully explain the literature. This information should be obtained and understood. Copies of this review should be given to the faculty members of the major area of study and to the Graduate Office at least one week before the seminar. This review should be a maximum of ten (10) pages with a maximum of five (5) references and a minimum font size of 12 points. The written review must

1. highlight the key concepts of the material,
2. critically assess the major technical contributions and applications and
3. explain the significance to the major field of study.

The student can confer with faculty members during the preparation of this document; however, **the document must not be edited by any faculty member.**

At the oral exam, the student will present an uninterrupted seminar open to all faculty and students of at least twenty (20) minutes in length but no longer than thirty (30) minutes. This will be followed by a question and answer period, typically lasting thirty to sixty minutes, which is open only to the Department faculty and any designated persons outside the faculty to whom the Department faculty present indicate no objections. Questions on source material, engineering fundamentals, and topics broadly related to the source material and major area will be allowed.

Upon completion of the seminar and oral examination, all Department faculty members present at the seminar will vote on the outcome of the examination using the criteria found at the beginning.
of Section E above. A majority vote is required in order to pass. The oral examination will be given once, unless the examiners, by majority vote, recommend a second and final oral presentation. If a second oral exam is recommended, it must be completed before the end of the following quarter. The examiners may also, by majority vote, require the student to retake the written examination. A student who does not pass the oral examination will not be denied a chance to retake the examination, subject to the time limitations of Section E Part 1 above.

c. Procedure
An application to take the Ph.D. Qualifying Examination must be completed and returned to the Graduate Office no later than the posted deadline, generally three weeks before the date of the written examination.

The topic must be chosen, and the seminar must be scheduled by the student and registered with the Graduate Office no later than two weeks after notification of having passed the written examination, and must be completed by the end of the quarter. The notification to the Graduate Office must include an indication, either via a faculty sign-off sheet or by email messages to the Graduate Director, that the scheduled time for the seminar is acceptable to a majority of faculty members in the major area of study. It is expected that the student will work diligently to find a time suitable for as many faculty as possible, not a simple majority. A written seminar announcement stating the time and place of the presentation must be distributed to all members of the faculty at least one week before the scheduled date.

All Department faculty members of the student’s major area of study are expected to be present at the oral examination; however, all members of the Department faculty are welcome, as are other persons to whom the faculty members present have no objection. A minimum of three (3) Department faculty members must be present.

Failure of the student to meet any of the requirements stated in this section is justification for failure of the PhD Qualifying Examination.

d. Change of Major
If a student changes major area of study, the entire Ph.D. examination must be repeated.

e. Right to Review Failed Questions
The following information regarding a student’s performance on the examination shall become part of the student’s Departmental file and as such will be available for review upon request to the Director of Graduate Studies:

- The breakdown of the four (4) grades received in the written exam;
- Written justification for any failing grade, if applicable.

In addition, for a period of three weeks from the date of notification of the results of the examination, a student who failed a question, either written or oral, may request a meeting with the appropriate faculty member at a mutually acceptable time in order to discuss the question. For written examination questions, a photocopy of the graded question will be provided to the faculty member. **The examination books will be destroyed after this three-week period plus any period required for the meeting, but in any event will not be held past the end of the quarter in which the written examination was taken.**
F. Ph.D. Dissertation Proposal

All doctoral students in the Department of Aerospace Engineering and Engineering Mechanics who have passed the Ph.D. Qualifying examination must have a Dissertation Proposal accepted before they can be admitted into candidacy in accordance with the rules and guidelines of the Division of Graduate Studies and Research as set forth in the University Graduate Handbook, Chapter 7, Candidacy.

The purpose of the Dissertation Proposal is to ascertain the appropriateness of the student's proposed research to constitute a Doctoral Dissertation as well as the student's ability to carry through with the proposed research. The following specific rules and regulations govern the Dissertation Proposal in the Department of Aerospace Engineering and Engineering Mechanics.

1. Time Requirements

No later than the end of the quarter immediately following the quarter during which a student has passed the Ph.D. Qualifying Examination, he/she must select a Dissertation Advisor.

At least one year prior to graduation, the student must have a Dissertation Proposal presented to and accepted by his/her Dissertation Committee. A completion form must be submitted to the DGS at that time. Forms are available in the Graduate Office. Recall, that only five (5) years are allowed prior to Ph.D. candidacy. (see Section H).

The choices of a dissertation advisor and Dissertation Committee will be communicated to the DGS by the student, also no later than the end of the second quarter following the quarter during which he/she has passed the Ph.D. Qualifying Examination, using the appropriate form (which may be obtained from the Graduate Administrative Coordinator), and securing on the form the signatures of the Advisor and Committee Members.

A student who changes dissertation advisor and/or Dissertation Committee must still satisfy the last of these time requirements and have an accepted Dissertation Proposal no later than during the fourth quarter following the quarter during which he/she has passed the Ph.D. Qualifying Examination.

The timeline below summarizes the above time requirements.

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<tr>
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<th>Q2</th>
<th>Q3</th>
<th>At Least One Year prior to Graduation</th>
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<td>Student must have</td>
<td>Student's Dissertation</td>
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<td>Ph.D. Qual. Exam</td>
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In exceptional cases the time requirements specified above may be waived upon petition to the DGS (see Section 2 below).

2. Petition Requirements

A student wishing to depart from the time requirements of Section A shall notify, by petition, the Director of Graduate Studies of his/her intentions. This written petition, detailing the reasons for
the departure, should be received and approved prior to the expiration of the time requirement for which departure is requested.

3. The Ph.D. Dissertation Proposal
A Dissertation Proposal is a typed document detailing the student's proposed Dissertation Research. The student is required to present orally the Dissertation Proposal to his/her Dissertation Committee. The Dissertation Proposal must be distributed by the student to the members of his/her Dissertation Committee at least one week prior to the oral presentation.

After the oral presentation, the Dissertation Committee shall evaluate the Dissertation Proposal and accept or reject it. The evaluation criteria are:

• The scientific merits of the proposed research, in particular its originality and contribution to the state of the art in the discipline of the proposed research.

• The realism and reasonableness of the proposed research.

• The qualifications of the student to conduct the proposed research.

The result of this evaluation shall be communicated in writing by the Dissertation Advisor, with signatures from all members of the Dissertation Committee, to the Director of Graduate Studies. A copy of the Dissertation Proposal shall be attached to this written evaluation and both will be included in the student's departmental file.

A doctoral student is not allowed to have more than one rejection of a Dissertation Proposal. Thus a student who has had a proposal rejected twice or two proposals rejected once shall be asked to leave the departmental doctoral program.

G. Candidacy and Time Limitations
A student admitted to the Ph.D. program becomes a Ph.D. candidate when he/she has passed the Candidacy Exam (Ph.D. Qualifying Examination) and has satisfactorily completed all required course work beyond the M.S. degree. As stated in the University Graduate Handbook, Chapter 7, Candidacy (Doctoral Degree Program), a doctoral student shall be admitted into candidacy when he/she has:

a. Achieved and maintained a GPA of at least 3.0 in all doctoral course work. (Department Rule)
c. Passed the department qualifying exam.
d. Accumulated at least the minimum total of graduate credits specified by the student’s academic program.

The student who has completed all requirements for candidacy will be officially admitted into candidacy when the advisory department fills out the proper candidacy form, including the Dissertation Advisor and Committee form, and submits it for inclusion in the student’s official record.

The doctoral degree will be granted for no less than the equivalent of three (3) years of full-time graduate study.

The overall maximum time limit for doctoral degree completion is nine (9) years: five (5) years to candidacy and four (4) years from candidacy to degree completion.

Candidacy for the doctorate automatically terminates after four (4) consecutive calendar years. Candidates may petition the Graduate Council through their department, college, and the University Dean for extension of candidacy prior to its expiration or for reinstatement if candidacy has expired. If reinstatement is approved, the student will be readmitted to
candidacy only after satisfying the formal candidacy examination requirements administered by the department.

Registration and fee payment for at least one credit hour in the Autumn Quarter is required for each student if his/her candidacy is not to lapse.

Students who interrupt their graduate studies by withdrawing from the University, either officially or by failing to register for an entire academic year, will be held responsible for the graduate program requirements in force and published at the time they re-enter that program.

H. Dissertation

1. Dissertation Advisor and Committee

The student in consultation with the Dissertation Advisor should form an advisory committee that includes at least two additional faculty members after he/she passes the qualifying exam. At least one member of the committee must be a member of the Aerospace Engineering and Engineering Mechanics Department. If the advisor is from outside the Department of AsE/EM a faculty member from the Department of AsE/EM will serve as co-chairperson of the Committee.

In accordance with the University Graduate Handbook, Chapter 7, Dissertation, the dissertation committee must consist of at least three (3) full-time faculty members with professorial rank (tenure-track full, assistant, and associate professors – not adjunct, visiting, retired or emeriti), at least one of which is a member of the Graduate Faculty. Research faculty may serve on the committee or chair the committee. If the chairperson is not a member of the Graduate Faculty, at least two other members must be. If a faculty member or appropriate professional practitioner has special expertise in a dissertation topic, such a person may be added to the dissertation committee if he or she is nominated by the candidate and approved by both the chairperson of the dissertation committee and the director of graduate studies for the academic unit [AsE&EM] involved. Such a person would serve as a full voting member of the dissertation committee without compensation from either the University of the candidate.

See Sections V.A,G above for the selection and functioning of the Advisory Committee.

2. Final Defense of Dissertation

After completing the Dissertation, the candidate will give an oral presentation of the dissertation to the Advisory Committee and any other interested (or appointed) members of the Graduate Faculty of the University in an open seminar.

The date of this presentation will be arranged by the Dissertation Advisor and presentation of copies for binding (in accordance with the rules of the Engineering College) constitute the final requirements for the doctor degree. The final version of the Ph.D. Dissertation ready for electronic submission must be submitted to the Office of Vice President for Research and Advanced Studies no later than the published date. A grade of “P” should be given.

3. Publication of Dissertation

The Office of Vice President for Research and Advanced Studies provides graduate degree candidates with detailed information concerning the written form of the Dissertation and the mechanics of preparing the final draft and abstract. Regulations regarding electronic submission, number of Dissertation copies to be submitted, and other documents required are also available from that office. It is the responsibility of the student to see that he/she is in compliance with these regulations.

The university rules are reproduced below:
Submission of Dissertation

After a dissertation has been approved, the candidate for the doctor of degree is required to follow the doctoral dissertation electronic submission procedures detailed on the Office of Advanced Studies website at www.grad.uc.edu, “Graduation,” “Submitting your Thesis or Dissertation.”

A brief overview of the submission process is provided below, but students are responsible for reviewing the most current and detailed instructions on the website referenced above.

The student must submit the following to the Office of Advanced Studies in an 8½” x 11” brown manila envelope:

- One electronic PDF file of the dissertation.
  - A text-only/plain-text file abstract on disk. This abstract must be approved by the advisory program and shall consist of not more than 350 words.
  - The student is responsible for any conversion of formulas and characters when the abstract is saved in a text-only file.
- Two original approval forms with original signatures on each, downloaded on acid-free paper from the graduate website at www.grad.uc.edu, “Graduation,” “Submitting your Thesis or Dissertation,” “Committee Approval Form.”
- A receipt verifying payment of the University publication fee to the University Cashier’s Office.
- Copyrighting of the dissertation is optional; a doctoral candidate may request that his or her dissertation be copyrighted by Bell and Howell/UMI. If desired, the $45 fee is paid at the Cashier’s Office, and the receipt is submitted to Advanced Studies.
- Embargo Form, completed and signed.

Electronic dissertation formatting and submission information is posted on the Electronic Thesis and Dissertations (ETD) website www.etd.uc.edu. For questions not addressed on this site, contact Electronic Thesis and Dissertation Helpdesk (Room 559, Langsam Library), phone 556-1496 or email etd@uc.edu. (See Electronic Dissertations below.)

I. Graduation

Upon successful completing of the Dissertation defense, the Dissertation Advisor will forward a letter to the Director of Graduate Studies certifying that the student has completed all requirements for the degree. The letter must be accompanied by a duplicate copy of the front page of the dissertation, signed by the members of the examining committee and a completed "Certification for Graduation Form." The Director of Graduate Studies will sign the form and forward it to the Graduate Dean.

Each student who has successfully completed all requirements for any of the Ph.D. Programs in the Department of AsE/EM may apply to the Office of Vice President for Research and Advanced Studies for graduation. It is the responsibility of the student to insure that all forms, procedures and regulations required by that office for graduation are fulfilled. See Chapter 7, Graduation of the University Graduate Handbook for these requirements.
VI. SPECIAL RULES AND PROVISIONS

A. Nondiscrimination Policy
The Department of AsE/EM reaffirms the University of Cincinnati policy that discrimination on the basis of race, color, religion, national origin, sex, sexual orientation, handicap or age will neither be practiced nor tolerated in any of its activities. Complaints involving discrimination should be directed to the Director of Graduate Studies and/or the Head of the Department.

B. Right to Review Records
Students, once enrolled, have the right to review their educational records, except for those excluded by law, such as those maintained by a physician or psychiatrist, or parent's financial statement. Educational records are maintained in such offices as Student Records, the Engineering Dean's Office, the Graduate Dean's Office, Student Financial Aid, Career Development and Placement, Educational Advising, as well as in the AsE/EM Graduate Office.

In order to gain a review of such records, along with any appropriate explanation or interpretation, the student should first address the proper university or collegiate office. In the Department of AsE/EM, files are maintained which include: (a) the original applications from the admission; (b) University personnel payroll forms; (c) university grade forms; (d) Research Advisor and Research Advisory Committee progress reports and letters; (e) copies of all correspondence from the Director of Graduate Studies and Department Head; (f) results of candidacy examinations; (g) certification of candidacy and graduation forms; (h) a copy of the front page of the thesis signed by the student's RAC. Students wishing to review these files must submit a request with the DGS. If the student feels there are inaccuracies, he/she may place a letter of explanation in the file.

C. Grievance Procedure
Each student shall receive a copy of the university document titled Graduate Student Grievance Procedures at the time of entrance into the graduate program. Copies will be made available at the new graduate student orientation program conducted in September of each year. Other copies are available in the Department Office and from the AsE/EM Graduate Student Association. The Department of AsE/EM reaffirms its adherence to these procedures.

At any time a graduate student may petition the Graduate Committee to hear a grievance on any matter concerning the Graduate Program (probation, teaching duties, examinations, use of departmental equipment, etc.) and the DGC will attempt to resolve the issue. However, the student has the right to pursue any and all procedures outside of the Department.

D. Academic Honesty
Academic dishonesty in any form is a serious offense and cannot be tolerated in an academic community. Dishonesty in any form, including cheating, plagiarism, deception of effort, unauthorized assistance, or manufacturing of data may result in a failing grade in a course or graduate research credits, and/or immediate suspension or dismissal, as described in Chapter 8, Academic Honesty of the University Graduate Handbook.

E. Implementation of Provisions of this Handbook
The provisions of this handbook have been previously adopted by the Department of AsE/EM and were contained in preceding departmental documents and minutes of the DGC or the AsE/EM meetings. Provisions not specifically addressed in this and earlier documents follow those of the University Graduate Handbook.
The current *Graduate Handbook of the Department of AsE/EM* is adopted as the official graduate procedures as of 9/01/04. All graduate students entering or reentering a graduate program in the Department of AsE/EM after that date are subject to all the rules and regulations herein.
A. Course Requirements for Non-Engineering B.S. Students

All Students entering the MS/Ph.D. programs in Aerospace Engineering or Engineering Mechanics must have taken the equivalent of, or demonstrated proficiency in:

1. Math through Advanced Calculus (20-025-376)
2. Basic Fluid Mechanics (20-031-383)
3. Basic Thermodynamics (20-031-382)
4. Mechanics III (20-031-103)
5. Strength of Materials (20-031-375)
6. Basic Heat Transfer (20-031-385)

This is considered minimum proficiency for all students. A student may need additional remedial work to satisfy or to prepare for advanced work in their field of study. This must be arranged in consultation with their respective advisor.