

**LEHIGH UNIVERSITY**

**DEPARTMENT OF MECHANICAL  
ENGINEERING  
AND MECHANICS**

**GRADUATE DEGREE  
PROGRAM GUIDELINES**

**Final Version for Fall Semester 2018  
August 24, 2018**

**DEGREE PROGRAM REQUIREMENTS**  
**MASTER OF ENGINEERING DEGREE AND MASTER OF SCIENCE DEGREE\***  
**Mechanical Engineering and Mechanics**

***UNIVERSITY REQUIREMENTS FOR ALL TYPES OF MASTERS DEGREES***

In meeting the requirements for the Master of Science or Master of Engineering degree, the student must satisfy the following common (University) requirements, as outlined in the Graduate Student Handbook.

1. The minimum program for all Master's degrees includes:
  - Not less than 30 credit hours of graduate work; audit credits may not be used towards the degree. Research or thesis registration counts as part of the 400-level course requirement.
  - Not less than 24 credit hours of 300- and 400-level coursework of which at least 18 hours is at the 400-level.
  - Not less than 18 credit hours in Mechanical Engineering and Mechanics
  - Not less than 15 credit hours of 400-level coursework in Mechanical Engineering and Mechanics.
2. Eighteen (18) credit hours in the major field of Mechanical Engineering and Mechanics are required. These courses must be 300- and 400-level courses. The remaining twelve (12) credit hours may also be taken in Mechanical Engineering and Mechanics (300- and 400-level courses), or they may be taken in any other field in engineering in which courses for graduate credit are offered, subject to the approval of the student's advisor.
3. A graduate student may include in his or her program courses numbered 200 or higher outside of Mechanical Engineering and Mechanics. These courses must have sufficiently deep engineering/science content comparable to 200 level courses in Mechanical Engineering and Mechanics. Only courses numbered 300 or higher in Mechanical Engineering and Mechanics may be included in a student's program. A graduate student registered in 200 or 300 level courses may be assigned additional work at the discretion of the instructors. Courses taken outside of Mechanical Engineering and Mechanics are subject to approval by the advisor and the Departmental Graduate Committee.
4. All candidates for a Master's degree must submit the form entitled *Program for Master's Degree* as soon as possible after accruing 15 credit hours of courses but no later than the semester before the student graduates. This form is eventually approved by the Registrar. The timing for completion of this form is critical, as it allows for corrections to a student's course plan if necessary.
5. The Master's degree is not granted unless the candidate has earned grades of B- or better in at least eighteen hours of the work in his/her program and in **all** 300-level courses in Mechanical Engineering and Mechanics. No course in which the grade earned is less than C- is credited towards the degree.

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\* Each degree candidate is responsible for ensuring that his/her program is compatible with the degree requirements given in the most recent version of the Lehigh University Catalog and the Graduate Student Handbook of the P. C. Rossin College of Engineering and Applied Science:  
([http://www.lehigh.edu/engineering/pdf/graduate\\_student\\_handbook.pdf](http://www.lehigh.edu/engineering/pdf/graduate_student_handbook.pdf)).

6. A student who receives more than four grades below B- in courses numbered 200 or higher becomes ineligible to qualify for the Master's degree or to register for any other 400-level courses.

### MASTER OF ENGINEERING DEGREE

#### ***EXISTING MASTER OF ENGINEERING DEGREE AVAILABLE TO INCOMING STUDENTS PRIOR SPRING 2019\*\****

***This degree will not offered as of Spring 2019 or thereafter. All incoming masters students, except those brought to the University with full financial support, pursue the Master of Engineering degree, which does not require submittal of a thesis***

***There are two paths that one may choose for the Master of Engineering degree program.***

The **first path** is a Master of Engineering degree which would include five core courses among 30 credit hours of courses, with the aim of eventually pursuing the PhD degree. In this case, the core course selection is the same as for the Master of Science Degree, as given below. Students who choose this option and have attained a gpa of at least 3.35 in their five core courses, will have completed the first stage of PhD candidacy (at the Department level), and can proceed to the second stage, which involves the General Examination. This path will also satisfy the requirements under the aforementioned heading ***University Requirements for all Types of Masters Degrees.***

The **second path** is the Master of Engineering degree with some or no core courses. The student takes 30 credit hours of courses, satisfying the requirements indicated under the aforementioned heading ***University Requirements for all Types of Masters Degrees.*** *If a student subsequently desires to pursue the PhD degree, he/she should aim to complete the five core courses, in order to satisfy the first stage of PhD candidacy.*

**\*\* Designation of Spring 2019 at this location and all other locations in this document assumes that approval of all changes by committees outside the MEM Department will be given prior to the start of the Spring 2019 semester; if approval is not secured in time, the effective date could move to Fall 2019.**

### MASTER OF SCIENCE (MS) DEGREE

#### ***EXISTING VERSION OF MASTER OF SCIENCE DEGREE THAT APPLIES TO INCOMING STUDENTS PRIOR TO SPRING 2019.***

The program for the Master of Science degree requires a minimum of 30 credit hours, which includes six hours of thesis credits, distributed as follows:

<b><u>ME 452</u></b>	<b>Mathematical Methods In Engineering I</b>	<b>3</b>
<b><u>ME 453</u></b>	<b>Mathematical Methods In Engineering II</b>	<b>3</b>
<b>or <u>ME 413</u></b>	<b>Numerical Methods in Mechanical Engineering</b>	
<b>Select three of the following courses:</b>		<b>9</b>

<b><u>ME 423</u></b>	<b>Heat and Mass Transfer</b>	
<b><u>ME 430</u></b>	<b>Advanced Fluid Mechanics</b>	
<b><u>ME 433</u></b>	<b>Linear Systems and Control</b>	
<b><u>MECH 406</u></b>	<b>Fundamentals of Solid Mechanics</b>	
<b><u>MECH 425</u></b>	<b>Analytical Methods in Dynamics and Vibrations</b>	
<b><u>ME 401</u></b>	<b>Integrated Product Development</b>	
<b>or <u>ME 402</u></b>	<b>Advanced Manufacturing Science</b>	
<b><u>ME 490</u></b>	<b>Thesis</b>	<b>6</b>
<b>Electives</b>		<b>9</b>
<b>Total Credits</b>		<b>30</b>

***Electives (9 credits)***

Electives, also known as free electives, are three additional courses, approved by both the student's advisor and the Departmental Graduate Committee, which complement the student's defined program. This can include coursework in either engineering or any other approved discipline. The courses that are selected for free electives, when considered with all other courses taken for the Master of Science degree, must satisfy the University's course distribution requirements for all types of Masters degrees, as described in the foregoing.

***Thesis (6 credits)***

Completion of six credits of M.S. thesis (ME 490) is required.

*Students should ensure that all courses for the Master of Science degree satisfy the distribution requirements of the University for all Masters Degrees*

***Department Requirement:***

***Presentation*** – The student must complete a professional quality poster and provide a contribution to the Department web page based on his/her M.S. thesis research.

***Thesis*** – The Department requires submittal of an unbound, signed copy of the student's thesis, along with a CD containing a pdf file of the thesis.

***Seminars*** – All students are required to attend a minimum number of MEM seminars.

*In the event that a student desires to pursue the Master of Science (thesis) degree, it is necessary to obtain the agreement of a faculty member willing to supervise the thesis research and to submit the Adviser Selection Form. The availability of faculty for research supervision depends on the specialty within the area of mechanical engineering and the ongoing advisory commitments of the faculty member during a given semester. Those students who wish to pursue*

*the Master of Science degree with a thesis should contact faculty members in their area of interest during their first semester of study.*

**NEW VERSION OF MASTER OF SCIENCE DEGREE THAT IS EFFECTIVE FOR INCOMING STUDENTS AS OF SPRING 2019**

The program for the Master of Science degree requires a minimum of 30 credit hours, distributed as follows.

<b>Group I: Required Core Course in Engineering Mathematics:</b>		<b>3</b>
<b><u>ME 452</u></b>	<b>Mathematical Methods In Engineering I (plus one of the following courses)</b>	<b>3</b>
<b>Group II: Required Core Course in Mechanical Engineering (2 courses):</b>		<b>6</b>
<b><u>ME 413</u></b>	<b>Numerical Methods in Mechanical Engineering</b>	
<b><u>ME 423</u></b>	<b>Heat and Mass Transfer</b>	
<b><u>ME 430</u></b>	<b>Advanced Fluid Mechanics</b>	
<b><u>ME 433</u></b>	<b>Linear Systems and Control</b>	
<b><u>ME 453</u></b>	<b>Mathematical Methods In Engineering II</b>	
<b><u>MECH 406</u></b>	<b>Fundamentals of Solid Mechanics</b>	
<b><u>MECH 425</u></b>	<b>Analytical Methods in Dynamics and Vibrations</b>	
<b><u>ME 401</u></b>	<b>Integrated Product Development</b>	
<b>or <u>ME 402</u></b>	<b>Advanced Manufacturing Science</b>	
<b>Group III: Three other MEM courses at the 300 and 400 level. (Only once course may be at the 300 level).</b>		<b>9</b>
<b>Group IV: Up to 4 free electives (12 credits) approved by the Graduate Program Coordinator or the Student's Advisor</b>		<b>12</b>

There are four options\*\* for the Master of Science degree:

1. MS-Thesis Option: 6 credits of ME490 (Thesis) must be taken as part of the free electives. If the student wishes to pursue a PhD, course requirements should following the PhD requirements (2 math courses, 3 core courses, 2 depth courses, 1 breadth course).

2. MS-Project Option: 6 credits of ME460 (Project) must be taken as part of the free electives

3. MS-Applied Engineering Option: 6 credits of course-work in MEM taken as part of the free electives

4. MS-Interdisciplinary Engineering Option: 12 credits of course-work outside MEM to satisfy the free electives

\*\*These options correspond to courses selected from Group IV of the foregoing overview: Up to 4 free electives (12 credits) approved by the Graduate Program Coordinator or the Student's Advisor

*Students should ensure that all courses for the Master of Science degree satisfy the distribution requirements of the University for all Masters Degrees*

*For students pursuing the Master of Science degree with a thesis, it is necessary to obtain the agreement of a faculty member willing to supervise the thesis research and to submit the Adviser Selection Form. Those pursuing the Master of Science degree with a project should secure the agreement of a faculty member who will supervise the (ME 460) project and submit the Graduate Engineering Project Permission Form. The availability of faculty for research and project supervision depends on the specialty within the area of mechanical engineering and the ongoing advisory commitments of the faculty member during a given semester. Those students who wish to pursue the Master of Science degree with a thesis or project should contact faculty members in their area of interest during their first semester of study.*

Department Requirement: All students are required to attend a minimum number of MEM seminars

**DEGREE PROGRAM REQUIREMENTS\***  
**DOCTOR OF PHILOSOPHY DEGREE**  
*Mechanical Engineering and Mechanics*

**ABBREVIATED OVERVIEW OF REQUIREMENTS FOR THE PhD DEGREE AND CRITICAL TIMELINES FOR FULL-TIME STUDENTS**

**1. Select a PhD adviser,** then complete and submit the Adviser Selection Form.

**2. Complete five core courses** with a minimum gpa of 3.35/4.0 within the first three semesters of graduate study. The student must use the first five core courses taken for the gpa calculation. Core courses may not be retaken. (If ME 453 is not taken as part of the core course sequence, it must be taken at a later point.)

*This requirement represents the first stage of candidacy at the Department level*

**3. Form the PhD Committee** (required for administration of General Examination).

**4. Complete the General Examination.** Students who started their PhD prior to the Fall 2018 semester can take either the existing form of the General Examination, or, if the PhD advisor, the student and the PhD committee are all in agreement, the student can take the new form of the General Examination. Students who start their PhD program as of the Fall 2018 semester must take the new form of the General Examination. The existing form of the General Examination must be completed no later than the end of the second semester after the minimum core course gpa is attained. The new form of the General Examination is taken during the fourth semester when the core course requirements will have been completed. Note: The University requirement is that the General Examination must be completed no later than seven months prior to the time when the candidate plans to receive the degree.

*This requirement represents the second stage of candidacy at the Department level.*

**5. Write the proposal for the PhD program.** The proposal includes the proposed research and the course plan. For students starting their PhD program as of the Spring 2019 semester or thereafter, the course plan must include three additional depth and breadth courses beyond the five core courses.

**6. Present the PhD proposal to the PhD Committee** no later than the end of the semester following the semester in which the General Exam was passed.

**7. File for PhD candidacy at the College level.** After the proposal is approved by the PhD Committee, submit the original General Exam Signature page, the original Proposal signature page, a copy of the proposal, and a completed Application to Candidacy form to Ms. Brie Lisk, 314A Packard Lab. Approval of the proposal by the Associate Dean admits the student to candidacy for the PhD in the P. C. Rossin College of Engineering and Applied Science.

**8. Present the dissertation research.** A dissertation defense announcement is sent to all faculty and graduate students at least one week prior to the defense presentation.

\*Each degree candidate is responsible for ensuring that his/her program is compatible with the degree requirements given in the most recent version of the Lehigh University Catalog and the Graduate Student Handbook of the P. C. Rossin College of Engineering and Applied Science:

[http://www.lehigh.edu/engineering/pdf/graduate\\_student\\_handbook.pdf](http://www.lehigh.edu/engineering/pdf/graduate_student_handbook.pdf)

## COURSE REQUIREMENTS FOR THE PhD

### *EXISTING VERSION OF PhD COURSE REQUIREMENTS THAT APPLIES TO STUDENTS STARTING THEIR PhD PROGRAM PRIOR TO SPRING 2019*

The first stage of qualification for pursuit of a PhD degree is the demonstration of a minimum competency in the engineering sciences by achieving a 3.35/4.0 grade point average in a total of five mathematics and core engineering science courses, to be selected as follows:

<b>Required Core Courses in mathematics (6 credits):</b>	
<b><u>ME 452</u></b>	<b>Mathematical Methods In Engineering I (plus one of the following courses)</b>
<b><u>ME 453</u></b>	<b>Mathematical Methods In Engineering II</b>
<b>or <u>ME 413</u></b>	<b>Numerical Methods in Mechanical Engineering</b>
<b>Required Core Courses in Mechanical Engineering (9 credits): Three courses are selected from:</b>	
<b><u>ME 423</u></b>	<b>Heat and Mass Transfer</b>
<b><u>ME 430</u></b>	<b>Advanced Fluid Mechanics</b>
<b><u>ME 433</u></b>	<b>Linear Systems and Control</b>
<b><u>MECH 406</u></b>	<b>Fundamentals of Solid Mechanics</b>
<b><u>MECH 425</u></b>	<b>Analytical Methods in Dynamics and Vibrations</b>
<b><u>ME 401</u></b>	<b>Integrated Product Development <u>OR</u></b>
<b><u>ME 402</u></b>	<b>Advanced Manufacturing Science</b>

These five courses may be taken as part of a student's study for a Lehigh Master of Science degree, Master of Engineering degree, or upon entry directly into the PhD program.

All courses to be included in the GPA calculation must be taken during the first three semesters of graduate study if the student is a full-time student; the first five core courses taken by the student are used for the GPA calculation. Core courses may not be retaken.

All PhD students must take **ME 453** Mathematical Methods in Engineering II, prior to graduation.

The PhD degree requires a minimum of 72 credit hours if taken at Lehigh, or 48 credit hours if a Master of Science degree was awarded from another accredited institution. Fifteen of these credit hours correspond to the required core courses.

**NEW PhD COURSE REQUIREMENTS EFFECTIVE FOR STUDENTS WHO START THE PhD DEGREE AS OF SPRING 2019 OR THEREAFTER.**

Students pursuing the PhD must complete a total of eight courses. Five of these courses are the required core courses and three are depth and breadth courses

**Required Core Courses**

<b>Group I: Required Core Courses in Engineering Mathematics (two courses):</b>	
<b><u>ME 452</u></b>	<b>Mathematical Methods In Engineering I (plus one of the following courses)</b>
<b><u>ME 453</u></b>	<b>Mathematical Methods In Engineering II</b>
<b>or <u>ME 413</u></b>	<b>Numerical Methods in Mechanical Engineering</b>
<b>Group II: Required Core Courses in Mechanical Engineering (minimum of 2 courses, up to three courses):</b>	
<b><u>ME 423</u></b>	<b>Heat and Mass Transfer</b>
<b><u>ME 430</u></b>	<b>Advanced Fluid Mechanics</b>
<b><u>ME 433</u></b>	<b>Linear Systems and Control</b>
<b><u>MECH 406</u></b>	<b>Fundamentals of Solid Mechanics</b>
<b><u>MECH 425</u></b>	<b>Analytical Methods in Dynamics and Vibrations</b>
<b>Group III: Optional Core Course (only one course):</b>	
<b><u>ME 401</u></b>	<b>Integrated Product Development</b>
<b>or <u>ME 402</u></b>	<b>Advanced Manufacturing Science</b>

**Required Depth and Breadth Courses**

In addition to the required core courses, it is necessary to complete:

- Two (2) graduate courses in the student’s (MEM) emphasis area (depth requirement); and
- One (1) graduate course outside the (MEM) emphasis area but related to the student’s research (breadth requirement).

A Group I math core course cannot be used to satisfy the breadth requirement. For students working in an interdisciplinary area, the advisor in coordination with the PhD committee possess the freedom to choose the most appropriate courses for the depth and breadth requirements.

PhD students must also take ME 453, which can either be taken as part of the five core course requirement or as an additional course.

## **GENERAL EXAMINATION**

Only after attainment of a minimum GPA of 3.35/4.0 in the five core courses is a student allowed to proceed with the General Examination.

Immediately following successful completion of the core courses, the student forms the Doctoral Committee, which includes the dissertation advisor as the Committee Chair. The minimum number of committee members is four. Of these, three, including the Committee Chair, are to be voting Lehigh faculty members. With the written approval of the Dean of the College, one of the three aforementioned faculty members, each of whom must have a doctoral degree, may be drawn from categories that include departmentally approved adjunct, professors of practice, university lecturers, and courtesy faculty appointees. This latter member may not serve as the Committee Chair. The fourth required member must be from outside the student's Department (or outside the student's program if there is only one Department in the college). Committees may include additional members who possess the requisite expertise and experience. The Doctoral Committee is responsible for both administration of the General Exam and oversight of the student's program of study.

Committee members must be approved by the University's Graduate and Research Committee; such approval may be delegated to the department or program sponsoring the degree.

The Doctoral Committee is responsible for both administration of the General Exam and oversight of the student's program of study.

### ***EXISTING VERSION OF GENERAL EXAMINATION THAT APPLIES TO STUDENTS WHO STARTED THEIR PhD PROGRAM PRIOR TO FALL 2018***

The General Examination consists of a detailed review, assessment, and proposed extension of a topic represented by a journal article selected by the PhD Committee. The student will have two weeks to prepare and present to the Committee a written document, details of which are defined by the PhD Committee. The student will then schedule a presentation of the document to the Committee, followed by questions. The decision on satisfactory completion of the General Examination will be based on both the written document and the presentation. Students are given two opportunities to pass the General Examination.

### ***NEW VERSION OF GENERAL EXAMINATION THAT APPLIES TO STUDENTS WHO START THEIR PhD PROGRAM AS OF FALL 2018 AND THEREAFTER***

The new version of the General Examination is completed during the fourth semester of graduate study.

Students taking the General Examination should register for three credits of the independent study course ME 450. The advisor of the PhD student should request, through the Associate Chair of the Department, her/his own section of ME 450 for this purpose prior to the start of the semester of the General Examination.

During the first half of the fourth semester, the advisor assigns a topic to the student after discussion with the student and approval of the Doctoral Committee. The student then does a literature search and defines several major unresolved issues in a report that should not exceed seven (7) pages of text. During the second half of the semester, the student formulates a research proposal that aims to clarify the underlying principles of the originally defined topic, while addressing the major unresolved issues. The format will conform to the

guidelines for a proposal of a major funding agency (NSF, NIH, DOE, DOD) and will not exceed ten (10) pages of text.

The student submits the proposal to the Doctoral Committee and schedules the oral exam by the last day of class. The Committee decides on a grade to be assigned upon completion of the three credit independent study course (ME 450). The General Examination must be passed at least seven months before the degree is to be conferred.

### **RESEARCH PROPOSAL AND FILING FOR CANDIDACY AT THE COLLEGE LEVEL.**

During the semester following completion of the General Examination (e.g., the Fall semester following completion of the General Examination during the Spring semester), the student completes a research proposal and applies for formal PhD candidacy at the College level. Formulation of the research proposal for the doctoral program includes not only the research plan, but also an outline of all coursework. The student presents the proposal in both written and oral form to his/her Doctoral Committee for approval.

Upon Committee approval, the proposal is submitted to the Associate Dean of Graduate Studies of the P. C. Rossin College of Engineering and Applied Science. In addition to the approved proposal, the student submits the original General Exam Signature page, the original Proposal Signature page, a copy of the proposal, and a completed Application to Candidacy form. These documents are given to Ms. Brie Lisk, 314A Packard Lab. Approval of the proposal by the Associate Dean admits the student to candidacy for the PhD in the P. C. Rossin College of Engineering and Applied Science.

### **DISSERTATION PREPARATION AND DEFENSE**

Upon completion of coursework and research, the candidate prepares a dissertation describing the results and conclusions of his/her research. A written dissertation draft is submitted to the Doctoral Committee, and the candidate presents a public defense of the dissertation. A dissertation defense announcement must be sent to all faculty and graduate students in the department and posted within the department at least one week before the defense is given. A satisfactory defense of the dissertation and acceptance of the written draft by the Doctoral Committee completes the Departmental requirements for the doctoral degree. To complete the degree requirements, especially in this final phase, the dissertation must also conform to the timing and guidelines of the P. C. Rossin College of Engineering and Applied Science, as described in the College Graduate Student Handbook. Candidates should be especially aware of strict timelines for submitting drafts of the dissertation; these timelines are indicated in the academic calendar and are available from the Registrar's Office.

### **ADDITIONAL REQUIREMENTS**

#### ***Requirements in effect for students who start the PhD degree as of Fall 2018***

- Two or more manuscripts must be submitted for (peer-reviewed) journal publication prior to the dissertation defense. At least one of these manuscripts must have gone through a first (external) review process. A student may petition, with detailed justification, to account for unusual preparation efforts, for example: submittal of a single manuscript to an extraordinarily competitive journal; an unreasonably long review time for a submitted manuscript; and alternate products consistent with the indicators of scholarship in the student's area of research.

- The minimum number of department seminars must be attended by the student during the course of the PhD program.

#### **REPLACEMENT CORE COURSE**

***Effective for students who start their PhD program as of Spring 2019 (All students may, however, petition for a replacement course at any time)***

A minimum GPA of 3.35/4.0 (based on the first five graduate core courses taken) must be attained. This minimum GPA requirement represents the first stage of candidacy for the PhD degree at the Department level. If the minimum requirement is not met, the student may petition to: (a) take one replacement course from the same Group I, II or III of core courses; or (b) take one replacement course in the form of a (non-core) advanced course, but only after the petition is approved and the course instructor is made aware of the student's petition for grade replacement. All petitions require approval of the PhD advisor, then approval of the Graduate Committee.

#### **TRANSFER OF COURSES TAKEN AT ANOTHER UNIVERSITY**

***Effective for students who start their PhD program as of Spring 2019 (All students may, however, petition for this type of course transfer at any time)***

A student pursuing the PhD after completion of an MS/MSc degree from another institution may petition to have two courses taken at that institution be approved as equivalent to MEM core courses, with no more than one course equivalent to a Lehigh Group I core course (math course) and one course equivalent to a Group II core course (course in a fundamental subject area). In addition, the student may petition to substitute courses taken elsewhere for the two (2) non-core advanced courses in their subject area (depth requirement) and the one (1) non-core course outside their emphasis area (breadth requirement). All of the foregoing replacement courses must be approved by the instructor of the corresponding Lehigh course. The student must submit a petition with the following: (a) a syllabus in English or a sufficiently detailed print-out of the course catalog from the MS institution; (b) a letter of support or a signed petition from the PhD advisor; and (c) any additional documentation beyond the syllabus as requested by the instructor. If permission is granted for the foregoing replacement courses, three (3) core courses will remain for completion at Lehigh.

## **UNIVERSITY AND DISTANCE EDUCATION RESIDENCY REQUIREMENTS**

### **University Residency Requirement for Distance Education PhD Students**

Concentrated Learning Requirement: To fulfill the concentrated learning requirement for the doctoral degree, a candidate must complete two semesters as a full-time graduate student or at least 18 credit hours of Lehigh graduate study within a fifteen-month period either on or off campus. The concentrated learning requirement is intended to ensure that doctoral students spend a period of concentrated study and intellectual association with other scholars. Individual departments may impose additional stipulations. Candidates should check with their advisors to be certain that they have satisfied their concentrated learning requirements.

### **Department Residency Requirement for Distance Education PhD Students**

After a PhD student has passed the General Examination, PhD students who perform their research at a remote location are required to spend two days of intellectual association at Lehigh during each semester of the academic year. Each visit is to include:

- (i) A 20 minute presentation given to a defined group of graduate students and a limited number of faculty on a recent research article of direct relevance to the research of the PhD student. This presentation will be followed by extensive discussion and interaction.
- (ii) Discussion of issues of mutual research interest with a minimum of three other graduate students engaged in related research at the University. These students may be within the research group of the dissertation adviser or another adviser(s).

The PhD student will submit documentation each semester to the Secretarial Coordinator of the Graduate Program, indicating satisfaction of requirements (i) and (ii). Documentation of requirement (i) will include the complete citation of the journal article that served as the basis for the 20 minute presentation and names of graduate students and faculty present. For requirement (ii), a one page summary of the interactions with other students is required, including their names and highlights as to how the student's own research has been influenced by these discussions.