

# GRADUATE STUDENT HANDBOOK



P.C. Rossin  
College of Engineering and Applied Science

2009-2010

**P.C. Rossin College of Engineering and Applied Science  
Graduate Personnel**

S. David Wu, Dean	sdw1	758-5308
John P. Coulter, Associate Dean of Graduate Studies and Research	jc0i	758-6310
Donna M. Mohr, Director of Graduate Recruiting & Program Development	dgm206	758-4553
Brianne Lisk, Administrative Coordinator of Graduate Studies & Research	brc3	758-6310

**Department and Program Personnel**

<b>Bioengineering</b>		
Anand Jagota, Director	anj6	758-4396
Elaine Correll, Program Coordinator	emc2	758-4091
<b>Chemical Engineering</b>		
Anthony J. McHugh, Chairperson	ajm8	758-4470
James T. Hsu, Faculty Graduate Coordinator	jth0	758-4257
Barbara Kessler, Program Contact	bak0	758-4261
<b>Civil and Environmental Engineering</b>		
Stephen P. Pessiki, Chairperson	spp1	758-3494
John L. Wilson, Faculty Graduate Coordinator	jlw2	758-3519
Prisca M. Vidanage, Graduate Coordinator	pmv1	758-3530
<b>Computer Engineering</b>		
Mooi Choo Chuah, Co-Director	mcc7	758-4061
Meghanad Wagh, Co-Director	mdw0	758-4142
Heidi Wegrzyn, Program Coordinator	hew207	758-3099
<b>Computer Science and Engineering</b>		
Daniel Lopresti, Chairperson	dal9	758-5782
Judy Frenick, Graduate Coordinator	jlf2	758-3065
<b>Electrical and Computer Engineering</b>		
Filbert J. Bartoli, Chairperson	fjb205	758-4070
Yujie Ding, Faculty Graduate Coordinator	yud2	758-4582
Tammy Shellock, Graduate Coordinator	tjs7	758-4072
<b>Energy Systems Engineering</b>		
Andrew J. Coleman, Director	ajc390	758-3529
Shaku Jain-Cocks, Program Coordinator	shj208	758-3650
<b>Industrial and Systems Engineering</b>		
Tamás Terlaky, Chairperson	tat208	758-4050
Ted Ralphs, Faculty Graduate Coordinator	tkr2	758-4784
George Wilson, Faculty Graduate Coordinator	grw3	758-4035
Rita R. Frey, Graduate Coordinator	rrf0	758-4051
<b>Manufacturing Systems Engineering</b>		
Keith M. Gardiner, Director	kg03	758-5070
Carolyn C. Jones, Program Coordinator	ccj1	758-5157
<b>Materials Science and Engineering</b>		
Helen Chan, Chairperson	hmc0	758-5554
Raymond A. Pearson, Faculty Graduate Coordinator	rp02	758-3857
Anne Marie Lobley, Graduate Coordinator	amme	758-4222
<b>Mechanical Engineering and Mechanics</b>		
Gary Harlow, Chairperson	dgh0	758-4102
Donald O. Rockwell, Faculty Graduate Coordinator	dor0	758-4107
JoAnn Casciano, Graduate Coordinator	jmc4	758-4107
<b>Polymer Science and Engineering</b>		
Raymond A. Pearson, Director	rp02	758-4470
Anne Marie Lobley, Program Coordinator	amme	758-4222

# Table of Contents

<b>GRADUATE, DEPARTMENT &amp; PROGRAM PERSONNEL .....</b>	<b>ii</b>
<b>ACADEMIC YEAR CALENDAR .....</b>	<b>iv</b>
<b>1.0 UNIVERSITY AND COLLEGE PROCEDURES .....</b>	<b>1</b>
<b>1.1 Admissions .....</b>	<b>1</b>
<b>1.2 Graduate Student Orientation .....</b>	<b>4</b>
<b>1.3 Registration .....</b>	<b>5</b>
<b>1.4 Graduate Student Petitions .....</b>	<b>8</b>
<b>1.5 Graduation .....</b>	<b>8</b>
<b>1.6 Expenses .....</b>	<b>9</b>
<b>2.0 OFFICE OF RESEARCH AND SPONSORED PROGRAMS .....</b>	<b>11</b>
<b>3.0 FINANCIAL AID .....</b>	<b>14</b>
<b>4.0 DEGREE PROGRAMS AND REQUIREMENTS .....</b>	<b>20</b>
<b>4.1 Graduate Degrees Offered .....</b>	<b>20</b>
<b>4.2 Academic Standards and Grades .....</b>	<b>21</b>
<b>4.3 Master’s Degree Requirements .....</b>	<b>22</b>
<b>4.4 Doctor of Philosophy Degree Requirements .....</b>	<b>25</b>
<b>4.5 Thesis and Dissertation Guidelines .....</b>	<b>31</b>
<b>4.6 Cross disciplinary Graduate Study and Research .....</b>	<b>39</b>
<b>5.0 ADDITIONAL SUPPORTING OFFICES INFORMATION .....</b>	<b>49</b>
<b>5.1 Office of International Students &amp; Scholars .....</b>	<b>49</b>
<b>5.2 Office of Graduate Student Life .....</b>	<b>49</b>
<b>6.0 INDEX .....</b>	<b>53</b>
<b>LEHIGH UNIVERSITY MAP .....</b>	<b>back cover</b>

## Fall 2009 Academic Calendar

Changes to this calendar are made from the version found on our Registrar's website which may be accessed by clicking on "Academic Calendars" at the registrar's homepage.

<b>August 17-21</b>	<b>Graduate Student Orientation</b>
August 21	Graduate Student Registration
August 24	Classes Begin
August 28	Last day to add courses without instructor's signature; Last day of web registration
September 6	Degree awarding date
September 7	Labor day; classes held
September 4	Last day for Fall registration; Last day to drop a course without a "W"
September 19	Rosh Hashanah
September 11	Last day to select or cancel Pass / Fail grading
September 28	Yom Kippur
September 22	Four o'clock quiz day 1
September 23	Four o'clock quiz day 2
September 24	Four o'clock quiz day 3
September 30	Four o'clock quiz day 4
October 1	Four o'clock quiz day 5
October 5-6	Pacing break – no classes held
October 14	Mid term grades due
October 28	Four o'clock quiz day 1
October 29	Four o'clock quiz day 2
November 2	Last day to file applications for a January degree;
November 3	Four o'clock quiz day 3
November 4	Four o'clock quiz day 4
November 5	Four o'clock quiz day 5
November 9-20	Pre-registration for the Spring 2008 semester
November 10	Last day to drop a class with a "W"; Last day for January doctoral candidates to deliver approved dissertation drafts to the Associate Dean's Office
November 25-27	Thanksgiving break
November 24	Last day for hourly exams
December 4	Last day of classes; Last day to drop a course with a "WP" or "WF"; Last day for January Doctoral/Master's degree candidates to submit electronic dissertation/thesis, complete all necessary paperwork and all degree requirements
December 5	Review – Consultation – Study Period for Tuesday Classes
December 7	Review – Consultation – Study Period for Monday Classes
December 8	Final exams begin
December 16	Final exams end

# Spring 2010 Academic Calendar

<b>January 18</b>	<b>Graduate Student Registration</b>
January 17	Degree Awarding Date
January 18	Classes Begin
January 22	Last day to add courses without instructor's signature; Last day of web registration
January 29	Last day for Spring registration; Last day to drop / add a course without a "W"
February 5	Last day to select or cancel Pass / Fail grading
February 17	Four o'clock quiz day 1
February 18	Four o'clock quiz day 2
February 23	Four o'clock quiz day 3
February 24	Four o'clock quiz day 4
February 25	Four o'clock quiz day 5
March 1	Last day to apply for University Day Degree
March 15	Mid Term Grades Due
March 8 –12	Spring break
March 15	Classes Resume
March 30	Passover-classes held
April 2	Good Friday-classes held
April 1	Four o'clock quiz day 1
April 5	Four o'clock quiz day 2
April 6	Four o'clock quiz day 3
April 7	Four o'clock quiz day 4
April 8	Four o'clock quiz day 5
April 9	Last day to drop a class with a "W"; Last day for May doctoral candidates to deliver approved dissertation drafts to the Associate Dean's Office
April 12-23	Registration for Summer and Fall
April 23	Last day for hourly exams
April 30	Last day of classes; Last day to drop a course with a "WP" or "WF"; Last day for May Doctoral/Master's degree candidates to submit electronic dissertation/thesis, complete all necessary paperwork and all degree requirements
May 1	Review – Consultation – Study Period for Tuesday Classes
May 3	Review – Consultation – Study Period for Monday Classes
May 4	Final exams begin
May 12	Final exams end
May 24	University Commencement Day
July 1	Last day to file applications for a September degree
July 23	Last day for September doctoral candidates to deliver approved dissertation drafts to the Associate Dean's Office
August 13	Last day for September Doctoral/Masters candidates to submit electronic dissertation/thesis, complete all paperwork and all degree requirements

# 1.0 University and College Procedures

## 1.1 Admissions

A student who has taken the bachelor's degree or a degree in technology at any recognized college, university, or technical institution may be admitted as a graduate student, and by permission of the graduate and research committee, may pursue studies leading to an advanced degree.

To be considered for admission as a graduate student, the prospective student applies to the department or, in some cases, directly to the program. The decision to admit a student normally rests with an admissions committee and/or the Departmental Chairperson or program director. An offer of admission stands for one year following the semester for which the offer was made. If more than one year elapses, the prospective student's department reserves the right to reconsider the original offer.

There are three categories of graduate students: regular, associate, and non-degree. Only students so classified, or qualified Lehigh undergraduates, may register for graduate courses (those designated 400 level) and take such courses for credit.

### 1.1.1 Lehigh University Non-Discrimination Statement

Lehigh University seeks talented faculty, staff, and students from diverse backgrounds. Lehigh University does not discriminate on the basis of age, color, disability, gender, gender identity, marital status, national or ethnic origin, race, religion, sexual orientation, or veteran status in any area, including: student admissions; scholarship or loan awards; athletic, co-curricular, recreational, or social programs; academic programs, policies, or activities; and employment and employment development. Questions and complaints about this policy should be directed to: The Provost or The Vice President for Finance and Administration, Alumni Memorial Building, Lehigh University, Bethlehem, PA 18015.

### 1.1.2 Regular Graduate Students

Only regular graduate students are candidates for advanced degrees. Application deadlines for admission as a regular graduate student are as follows: fall semester, July 15; spring semester, December 1; summer I, April 30; summer II, May 30. ***Departments may have earlier deadlines, please check with the individual departments to make certain of their deadlines.*** The materials required for admission as a regular graduate student are consistent across the College, with a complete application consisting of the following items listed below. Only complete applications will be processed.

- 1) completed application form
- 2) official transcripts for all post-secondary education (issued by the University in a sealed envelope)
- 3) official record of Graduate Record Examination (GRE) scores (may be waived by some departments)

- 4) \$65 application fee (this fee will not be waived under any circumstances)
- 5) two letters of recommendation
- 6) Test of English as a Foreign Language (TOEFL) scores for prospective students whose native language is not English, with a minimum score of 550 on the paper based test, 213 on the computer based test, or 85 on the Internet-based test, is required for admission.

In order to be considered for admission as a regular graduate student, an applicant must satisfy at least one of the following conditions: satisfying one of these five conditions is necessary but not sufficient for admission as a regular graduate student.

- 1) have an undergraduate grade point average (GPA) of at least 2.75 out of 4.0;
- 2) have a GPA of at least 3.00 for the last two semesters of undergraduate study;
- 3) have scores at or above the 75th percentile on the GRE or other recognized exam;
- 4) have a graduate GPA of at least 3.00 on a minimum of twelve hours of graduate work at other institutions;
- 5) have successfully completed the probationary conditions as an associate graduate student.

If a department wishes to offer admission to a student who fails to meet any of the above five requirements, the department is required to submit its recommendation to the Associate Dean's Office with an explanation. Cases that cannot be resolved by the Chairperson or program director and the Associate Dean will be referred to the Graduate and Research Committee for a decision.

### **1.1.3 Associate Graduate Students**

Prospective graduate students who do not qualify for regular student status may be offered associate graduate student status. Applications for admission which are considered in the late admission period between the end of the regular admission period and the first day of classes can only be granted associate status. However, since each department's classification and requirements of associate status is different, you must check with the department to determine if you qualify to be admitted under associate status. Applications for non-degree status are an exception (see following page). In contrast to application requirements for admission as a regular graduate student, admission decisions for associate status may be made in the absence of letters of recommendation, and with unofficial copies of University transcripts. However, the Registrar requires an official final transcript before grades may be released.

Individuals who are admitted to associate student status during the late admission period but who are qualified for regular student status may petition for the latter after the start of classes provided that all application documents (see requirements for regular graduate students) have been received.

Associate graduate students who do not qualify for regular status must complete the first nine consecutive credit hours of courses numbered 300 or higher with at most one grade of “C”, “C+”, or “B-“.

After the probationary period of nine credit hours is completed, an associate student must petition for regular student status in order to continue. The regular status admission documents must be submitted at this time, if they have not been previously submitted. Courses completed during a successful probationary period may count toward a graduate program if they are part of an approved program.

Associate students will be placed on probation when they receive their first grade below a “B-“ and will be dropped for poor scholarship at the end of a term when the student is assigned either two “C”, “C-” OR “C+” grades or one grade below “C-”. If an associate student is assigned two grades below a “B-” in the same term the student is eligible to be dropped without any term on probation. Once on probation, students remain on probation until they are granted regular status. Students who are eligible to be granted regular status but fail to apply by the regular student deadline will be evaluated according to the regular student criteria.

#### **1.1.4 Non-Degree Graduate Students**

Students who do not wish to enter a degree program may also seek admission with non-degree status. In this case, the prospective student completes an abbreviated application form which is available from the Office of Graduate Studies and Research located in Packard Lab Room 310. To contact this office via telephone the number is (610)758-6310. The internet address is <http://www3.lehigh.edu/engineering/admissions/nondegree2.asp>. The admission criteria for non-degree graduate students are:

- 1). A bachelor’s degree from an accredited institution with an overall grade point average of at least 3.0. Applicants with undergraduate GPAs below 3.0 may be admitted with the approval of the department in which they wish to take courses;

**or**

- 2). Evidence that the applicant is presently a student in good standing in an appropriate graduate program at an accredited institution.

**or**

- 3). Evidence that the applicant has received an appropriate graduate or other advanced degree from an accredited institution.

International students are required to demonstrate English language skills equal to those required of degree-seeking students in the College. All international applicants whose native language is not English must take the TOEFL (Test of English as a Foreign Language). A minimum score of 550 on the paper based test, 213 on the computer based test, or 85 on the internet-based test, is required for admission. This TOEFL requirement

may be waived if the international non-degree applicant has studied in an English-speaking university for at least one year.

Admission decisions for non-degree students are made by the Associate Dean of Graduate Studies and Research in the P.C. Rossin College of Engineering and Applied Science, or other responsible official designated by him/her for this purpose. The signature of the Associate Dean on the application and registration forms confers admission to non-degree graduate student status. Informal transcripts will be accepted for initial admission, but formal transcripts must be on record before the student can receive any transcript or grade report from the University or enroll for additional courses.

Non-degree students may take no more than twelve credit hours of graduate study within the College of Engineering at Lehigh. Any transcript or other record from the University will clearly indicate the student status as non-degree. Non-degree graduate students are not eligible for financial aid.

Non-degree students who wish to become degree-seeking must petition to the department. Please see *Graduate Student Petitions* on page 7 for further information.

### **1.1.5 Lehigh University Undergraduates**

Students of Lehigh University, who are within a few hours of meeting the requirements for a baccalaureate degree may, with the special approval of the instructor and the Associate Dean, enroll for a limited amount of work for graduate credit. Lehigh undergraduate students may apply course credits taken as an undergraduate toward a graduate degree under the following conditions:

- 1). the course credits may not have been submitted as part of the requirements for a previous degree;
- 2). courses at the 300 or 400 level must be approved by the course instructor, Departmental Chairperson, and the Associate Dean. A grade of “B” or better must be attained. It is not necessary for a student to inform the instructor beforehand;
- 3). a maximum of 6 credit hours taken while an undergraduate (in 300 or 400 level courses) may be used in a graduate degree program.

### **1.1.6 Readmission**

A student who has not been registered in a Lehigh graduate program for a continuous period of two years must petition for readmission. Petitions must be approved by the student’s department of study and forwarded to the Associate Dean’s Office.

## **1.2 Graduate Student Orientation**

Graduate student orientation and teaching assistant training sessions are offered the week before classes begin each semester. All new graduate students are invited to attend the orientation, which is designed to acquaint students with University resources and with members of the academic community, including administrators, faculty, staff, and fellow graduate students. A Graduate Student Fair during orientation gives new

graduate students facts about Information Resources, sports facilities, the Health Center, the Graduate Student Council, the bookstore, and a variety of other campus resources.

Special training sessions are offered for all new teaching assistants. Anyone who expects to assist with recitations or to teach a course must attend these sessions. Lab assistants are required to attend the session on lab safety, and all teaching assistants are required to attend a session on “Attitudes, Behavior and Cultures Training.”

For information on dates and details of this year’s Graduate Orientation Program, check the website [http://www.lehigh.edu/gradlife/new\\_student\\_orientation.html](http://www.lehigh.edu/gradlife/new_student_orientation.html).

An orientation program specific to the needs of international graduate students takes place during the regular orientation. The sessions provide practical information about visa/immigration issues, health, adjustment, programming, and living in the community. For more information, please contact the Office of International Students and Scholars at (610)758-4859. For those students who are going to be TAs, a speaking test (SPEAK) is required. For more information about ESL please contact the ESL Programs Office at (610)758-6099.

## **1.3 Registration**

### **1.3.1 Schedule Limitations**

All graduate students using Lehigh University resources and facilities must be registered. A full-time graduate student (no employment) may register for no more than fifteen semester hours. Graduate students who are full-time employees of the university may not take more than six semester hours of graduate work in any one semester. Half-time graduate student employees of the university (*e.g.*, half-time teaching assistants or half-time research fellows) may not take more than ten semester hours of graduate work in any one semester. Graduate students under contract to devote not more than one-third of their time to university employment may take a maximum of twelve semester hours in any one semester. Graduate students who are employed elsewhere and can give only part of their time to graduate work must restrict the size of their course load accordingly. The maximum registration in a summer session is six credits.

### **1.3.2 Full-time Status**

Full-time status is indicated for graduate students who register for a minimum of nine credit hours each semester or three credit hours in each summer session. After fulfillment of degree credit hour requirements full-time status may be maintained when the student is registered for fewer than nine credit hours. In such cases, status must be certified by the department and by the Associate Dean of Graduate Studies and Research. Below is a list of the requirements for full-time status certification:

Admitted to doctoral candidacy and have completed all course and credit hour minimum requirements (48 or 72), **or** have completed all course requirements for a masters with only thesis registration remaining, **or** are currently rostered for the remaining hours to complete the credit hour requirement for the degree (30 for a masters, or 48/72 for a doctorate).

**AND**

Rostered for at least one credit (usually maintenance of candidacy or an Audit, if all other stipulations are met).

**OR**

Registered for a required internship that is rostered for less than the required full time load.

Full-time status for a graduate student is important for at least three reasons: (1) full-time status may be required for students to be eligible for insurance coverage on their parent's policy or for exemption from repaying student loans; (2) international students may require full-time status for compliance with visa requirements; and (3) such information is used as input to university and national surveys on graduate education.

### **1.3.3 Pre-registration**

Pre-registration for graduate students is held for two weeks during the previous term at a time designated in the University Calendar. All graduate students must pre-register as courses which have small pre-enrollment figures may not be offered. Students should consult with their advisors concerning appropriate course selections. The Registrar's Office (758-3200) or the Bursar's Office (758-3160) can provide more information on these procedures.

### **1.3.4 Degree Registration**

Graduate student registration is held the week before classes officially start. Registration forms are available in the student's department office and must be signed by the advisor before being presented to the department office for approval.

When registration forms have been signed, fellowship and scholarship holders will need to have the College Financial Coordinator (317 Packard Lab, 758-4804) approve their tuition awards. Teaching assistants and graduate assistants must also receive signed approval from the College Financial Coordinator. Students for whom tuition is some form of Lehigh's employee benefits should go to the Office of Human Resources (428 Brodhead Avenue, 758-3900). Research assistants, whose tuition is paid for by research projects, are to have their registration forms forwarded by their departments to the Office of Research and Sponsored Programs for approval. Other graduate students must pay their tuition bills either in person or by mail at the Bursar's Office. Receipts will be issued upon request.

It is strongly recommended that payment for University-sponsored health insurance be made at the Bursar's Office during registration. International graduate students may not register without proof of the purchase of health insurance. In addition, incoming graduate students must obtain an identification card by presenting their Bursar's receipt to the ID Office, Ulrich Student Center, room 442A, 758-5843. Annual motor vehicle registration is made through Parking Services (106 Johnson Hall, 758-3893).

### **1.3.5 Auditing a Course**

With the consent of the Associate Dean, instructor, adviser, and the Chairperson of the department concerned, a graduate student may audit one or more courses outside the approved program of studies for the intended degree. A student who has attended a course as an auditor shall not be given an anticipatory examination for credit in that course and may not register for the course for credit in the future. The course will not count for credit towards any graduate degree.

A graduate student desiring to audit a graduate course without credit should register for the course by indicating "AU" under credit hours on the registration form. Tuition fees for auditing are the same as for a regular course. If a graduate student wishes to attend selected portions of graduate courses, he or she may do so with the prior approval of the course instructor and the advisor. *Non-degree graduate students are not permitted to audit courses.*

### **1.3.6 Late Registration Penalties**

A \$100 late registration fee will be assessed to students who do not register during the pre-registration period or register between the second and tenth day of class during the Fall and Spring semesters and the second and fifth day of class during the summer sessions. Students who have not completed the registration process by the tenth day of the regular academic semester or by the fifth day of a summer session will not be permitted to attend class.

Doctoral students registering for maintenance of candidacy that do not need full time certification may do so at any time during the semester without a late registration fee. If full time certification is required you must follow regular registration requirements.

If payment of tuition is an award from the Department or Dean's Office, registration must be done no later than the tenth day of class.

### **1.3.7 Degree Registration**

A student must be registered in the semester in which the degree is conferred.

### **1.3.8 Additional Services Provided by the Registrar**

In addition to maintaining student academic files, the Registrar also handles requests for transcripts. Written and walk-in requests to have transcripts mailed to schools and to prospective employers are honored. There is a Five dollar fee for walk-in requests. Final grades are available to students approximately 24 - 48 hours after the end of the final exam period, provided all student credentials are in order, and that the registrar has received the grades.

## 1.4 Graduate Student Petitions

The right of petition is open to all students at all times. The Graduate Student Program Petition form must be prepared completely and signed by the student's advisor, department faculty graduate coordinator, department chairperson, and associate dean of graduate studies. The form is then submitted to the Registrar for final action. Following on the next page is a **partial** list of situations that require approval through a graduate petition:

- Change of status from an associate (or non-degree) to a regular graduate student
- Readmission as a graduate student following an absence of five consecutive years
- Lehigh University graduate student wishing to transfer to another department for pursuit of a graduate degree
- Transferring credits from an accredited college or university to a Lehigh University graduate program
- Removal of an incomplete (N) grade after one calendar year has elapsed
- Changing members of the doctoral committee
- Extension of time to complete master's or doctoral degree requirements (see Time and Registration Requirements: Masters, p. 22; Doctorate, p. 25-26)
- Changing thesis credits to dissertation credits after the maximum six hours of thesis credit has been satisfied
- Undergraduate student wishing to enroll in a graduate level course

A petition is a request for a change or exception to be made to University policy and procedure, and therefore is evaluated on an individual basis.

## 1.5 Graduation

### 1.5.1 Application for Degree

Candidates for Masters and Doctor of Philosophy degrees must fill out an application for degree (two-part form) at the Registrar's Office. Below are the filing deadlines for May graduation and to receive the degree in September or January. Degree applications filed late will incur a fee of \$40.

<b>Graduation Date</b>	<b>File Application By</b>
May (University Day)	February 27
<b>Receive Degree</b>	<b>File Application By</b>
January	November 3
September	July 1

## 1.5.2 Registration Requirements

Please see **Degree Registration Requirement** on p. 7.

## 1.5.3 Clearance

Prior to the awarding of a degree, graduate students must receive clearance from the University. In particular, the following obligations must be satisfied:

- 1). Students must be certain that they have completed all coursework for any incomplete grades that they have received;
- 2). Theses and dissertations must be cleared by the appropriate authority. Theses are cleared by the Registrar's Office while dissertations are cleared by the Associate Dean's Office;
- 3). Financial obligations must have been met. Tuition, fees, bookstore charges, library fines, and motor vehicle fines must all be paid prior to graduation;
- 4). All library books must be returned;
- 5). The interdepartmental clearance sheet must be completed. This form requires the signature of the student's Departmental Chairperson, the Bursar, and Facilities Services before it is submitted to the Registrar at least three days prior to graduation.

## 1.6 Expenses

### 1.6.1 Tuition and Fees for 2008-2009

Tuition and fees for the P.C. Rossin College of Engineering and Applied Science program for the 2008-2009 academic year are listed below, and may increase on a yearly basis.

	<b>Per credit hour</b>	<b>Per Semester</b>
Tuition	\$1,150	
Per Credit course charge for audit	\$1,150	
Maintenance of candidacy		\$1,150
Master's candidate registration fee		\$1,150

<b>Other fees</b>	
Application fee (regular or associate admission consideration)	\$65
Application fee (non-degree status)	\$20
Late registration (Completing registration after announced date)	\$100
Late application for degree	\$40
Late payment (after announced date)	\$200

Returned check fine	\$35
Identification card (replacement)	\$15
Thesis, microfilming	\$55
Dissertation, microfilm	\$90

**Table 1 Tuition and fees for 2008-2009**

### 1.6.2 Tuition Payment

Graduate Students must register for courses and pay tuition during the registration period held the week before classes begin. Students who mail their registration forms, personal data sheets, and tuition payments to the Bursar's Office must be certain that their forms are postmarked by the final day of the registration period.

A Graduate Tuition Payment Plan is available to assist graduate students in paying for tuition. This payment option allows you to pay for tuition in three installments. If you are interested in this payment plan, you will need to enroll in the plan each semester. Please contact the Bursar's Office for more information, (610) 758-3160.

For students who are employed outside the university, if your employer reimburses your graduate tuition after completion of your course(s), you may be able to obtain a deferment of your tuition from the Bursar's Office until you are reimbursed. In order to do this, you will be required to sign a promissory note, submit information from your employer and pay a fee for the semester you are requesting the deferment. Please contact the Bursar's Office for more information (610) 758-3160.

### 1.6.3 Tuition Refunds

A student in good standing who formally withdraws from a course using a properly authorized withdrawal or add/drop form is eligible for a tuition refund based on when the form was *received* by the Registrar's Office. The refund schedule for student withdrawals and course adjustments is outlined in Table 2.

Full tuition refunds will be granted for registration cancellations only when a properly authorized withdrawal or add/drop form is *received* in the Registrar's Office prior to the start and including the first day of the classes. Properly authorized cancellation and add/drop forms *received* after the first day of classes will be recognized based upon the calendar day in which they are *received* by the Registrar. A student suspended or expelled from the University will not be granted a tuition refund.

<b>If the withdraw occurs</b>	<b>Percentage of tuition refunded</b>
Prior to the start of the semester (including the first day of class)	100%
2 <sup>nd</sup> day of class and beyond is calculated on a daily basis	Contact the Bursar's Office at 758-3160 for your exact refund.

**Table 2 Fee refund schedule**

### **1.6.4 Living Accommodations**

The university maintains a graduate student housing complex in Saucon Valley that has 136 living units. This complex, Saucon Village Apartments, provides units generally on a yearly lease basis. For more information contact Residential Services at (610) 758-3500 or [inrsd@lehigh.edu](mailto:inrsd@lehigh.edu).

## **2.0 Office of Research and Sponsored Programs**

The Office of Research and Sponsored Programs (ORSP) is responsible for assisting the faculty in the preparation of proposals, and in the preparation and administration of contracts, grants, and agreements. The Contract and Grant Specialists in ORSP serve as liaisons between faculty and sponsors, agencies and companies; coordinates with the Office of Technology Transfer and the faculty in patent and copyright considerations; reviews liaison agreements; monitors all research contracts / grants / agreements received by the University for fiscal integrity, and checks for institutional compliance with the sponsor's policies. Each University department or center is served by a Contract and Grant Specialist from the ORSP. To find out the contact information for the Contract and Grant Specialist working with your department, go to the ORSP website at: <http://www.lehigh.edu/~inors/programadm.html>.

The office is also charged with overseeing the following related activities of research and scholarly work.

### **2.1 Protection of Human Subjects in Research**

All research and experimental activities in which people participate as subjects must be approved by Lehigh's University Institutional Review Board (IRB) prior to the involvement of the subjects. This applies to all sponsored and unsponsored research, continuing education courses, thesis projects, and instructional projects and activities conducted by University students, staff, and faculty.

The University's basic policy places the primary responsibility for the protection of the welfare and the right of privacy of the individual subject on the principal investigator. The responsibility is shared by the University as an institution and, where outside support is provided, by the sponsoring agency.

To begin the review process the investigator should first reference the ORSP website: <http://www.lehigh.edu/~inors/inorsub.htm#humansubjects>. All studies to be submitted to the IRB for review must be submitted through IRBNet.org. This is a web-based system which streamlines the process and maintains all records for the IRB. Simply register in IRBNet and begin your submission by clicking on "Create a New Project". The forms to be completed are available on IRBNet. Training materials for IRBNet are available on the ORSP website.

The principal investigator and any other person involved in the study who will be interacting with the subjects of the study are required to complete an on-line tutorial on the protection of human subjects in research. The link to the online tutorial can be found at the website mentioned above. The certificate of completion of the online tutorial should be uploaded as part of the submission.

There are three types of review: exempt, expedited, and full committee review. Questions about review type eligibility should be directed to the Executive Secretary of the IRB at the Office of Research and Sponsored Programs.

The review process will not begin until the committee has all the required information. The IRB meets on the second Tuesday of each month (except March, if there is a conflict with Spring break) to review studies requiring full committee review. Studies qualifying for exempt and expedited review are reviewed continuously. All information should be submitted well in advance of the start date of the study (at least one month in advance, although eight weeks in advance is recommended).

A copy of an Informed Consent form and written explanation of the study must be given to each subject. In some studies, such as mailed questionnaires or on-line questionnaires, signed informed consent may be waived. However, the investigator must provide an informed consent document and an explanation of the study including a statement that clearly states that by responding or participating, the subject is granting consent for use of their data. This can be provided in a cover letter that the subject may retain.

Investigators will receive e-mail notification of the IRB's actions, comments, and recommendations through IRBNet. If a proposal is not approved, the principal investigator may request to be present at the next committee meeting.

Any changes made in a protocol or consent form must be promptly submitted for review as a Modification/Amendment through IRBNet. In most cases, these will receive an expedited review. All adverse reactions and unexpected side effects must also be reported immediately, through IRBNet.

When a project is completed, the study published and the identifiers removed from the data, the IRB should be notified through IRBNet.

## **2.2 Humane Care and Treatment of Laboratory Animals**

Before ordering or beginning any research, research training, experimentation or biological testing involving live, vertebrate animal(s), the investigator must submit and have received approval on an animal use protocol. Allow four weeks for protocol review and approval.

Completed protocol forms should be sent to the Institutional Animal Care and Use Committee (IACUC) via the Office of Research and Sponsored Programs. The protocol form provides specific data concerning the species to be used, detailed information related to the use of the animals and justification for the use of the animals. Other procedures which need to be addressed in the form are surgery, procedures to minimize pain, use of anesthetics, animal housing and methods of euthanasia.

The IACUC is composed of:

- one veterinarian with training or experience in laboratory animal science and medicine, who has direct or delegated authority and responsibility for activities involving animals at the institution;
- three practicing scientists experienced in research with animals;
- one member whose primary concerns are in a nonscientific area (e.g., ethicist, lawyer, member of the clergy); and
- one member who is not affiliated with the institution other than as a member of the IACUC; and
- the Executive Secretary who has administrative responsibility for the committee.

The completed protocol forms are distributed to all members of the IACUC for review. Any of the members may require that the investigator address specific questions or modify the protocol by submitting a revised protocol form or by attaching a modification. If this is the case, the revised protocol or modified protocol is resubmitted to all members. IACUC approval of all animal research protocols must be unanimous, and will be withheld if any committee member dissents. IACUC will provide a notice of approval to the investigator and to the Central Animal Facility, along with a copy of the investigator's full protocol.

Access to the Central Animal Facility is restricted to investigators and the staff designated in the approved protocols on file.

Any anticipated changes made to an approved protocol must be promptly reported through a modification form and requires IACUC approval.

Annual renewals are mandatory. Forms and tutorials can be found at <http://www.lehigh.edu/%7Einors/IACUC.htm>

### **2.3 Intellectual Property**

Any member of the University faculty, staff, or student body who develops or conceives of a patentable, copyrightable or other intellectual property while employed at Lehigh as a direct result of regular university duties, or of using university facilities, must disclose that property to the University through the Office of Technology Transfer (OTT). The OTT website <http://www.lehigh.edu/~intectrn/> provides guidance, contact information, and forms that will help navigate the process of protecting intellectual property. In addition, the University Policy on Intellectual Property can be found at: <http://www.lehigh.edu/~policy/university/ip.htm>.

## **3.0 Financial Aid**

Financial aid is available for regular, full-time or part-time graduate students. Associate and non-degree graduate students are not eligible for Stafford loans or Graduate Plus Loans, but may be eligible for alternative loans which are listed on the financial aid website, ([www.lehigh.edu/financialaid](http://www.lehigh.edu/financialaid)). Teaching assistantships (TA's), research assistantships (RA's), graduate assistantships (GA's), fellowships, and scholarships are academic awards made by the University, by individual academic departments, and by the Dean's Office. Several graduate assistantships unrelated to a particular area of study can be obtained by applying to administrative offices. Loans and work study employment are determined by the Office of Financial Aid and must be applied for thru the Financial Aid Office by completing a Lehigh University Graduation application.

### **3.1 Academic Awards**

Continuing students who request fellowships, scholarships, RA's, TA's, and GA's that will begin in the fall semester must file a request with their academic department no later than February 1. Generally, a special committee formed by departmental faculty makes recommendations for the recipients of these awards based on merit. Students are not required to submit a financial statement.

In addition to their stipends, graduate students holding half-time TA appointments generally receive tuition remission. Research assistants receive a stipend for research services and their tuition is commonly paid directly by research projects.

Joint appointments as teaching assistant, research assistant, and graduate project assistant are permissible, subject to appropriate approvals.

### **3.2 Teaching Assistants and Graduate Assistants**

Teaching Assistant (TA) and Graduate Assistant (GA) are technical terms used to describe specific types of Lehigh University student employees. The duties of TA's and GA's are generally set by the departments or offices that employ them, but certain conditions must be satisfied before a student can be classified as a TA or GA. These include:

- 1). Each TA/GA must be a regular full-time resident Lehigh graduate student. This status normally requires registration for at least nine credit hours per semester.
- 2). A TA/GA is a half-time position, and each TA/GA provides services to Lehigh University of up to 20 hours per week. Quarter-time and eighth-time TA/GA appointments are possible for full-time resident graduate students. Stipends and tuition remission are appropriately reduced for these positions.
- 3). Each TA/GA is paid a specific stipend which is set for the academic year by the University.
- 4). Qualified TA's/GA's receive tuition remission for nine credit hours in a regular semester. No TA/GA may register for more than ten credit hours. A student who is a TA/GA during the entire preceding academic year is also entitled to a

maximum of three credit hours of thesis, research, or dissertation, but not course credit, registration in the following summer.

- 5). Each TA/GA is appointed by a process that begins with a formal letter of appointment issued by the appropriate Departmental Chairperson. The appointment letter specifies standard university conditions, including stipend level, time of arrival, length of service, and the requirement of satisfactory academic progress and performance of duties. Each Departmental Chairperson submits written notification of TA/GA appointments to the Dean.
- 6). Tuition remission for qualified TA's/GA's is authorized by the Dean as part of the registration process.
- 7). The Dean is provided with tuition remission accounts against which TA/GA remissions are charged. The accounts are budgeted at an amount equal to the standard TA/GA tuition rate multiplied by the approved number of TA/GA positions included in the annual operating budget. The budgets shall not be exceeded. If additional TA/GA positions are desired on a temporary basis, the account executive must provide for the transfer of budget support to the remission account. These budgets are to be used exclusively for tuition remission for authorized TA/GA positions.

### **3.3 Summer Appointments**

There are a limited number of summer TA/GA appointments. These TA/GA employees must receive the same monthly stipend as academic year TA's/GA's and provide services of up to 20 hours per week to the University. A summer TA/GA registers for a maximum of three credit hours in each summer session of employment and receives tuition remission for that registration, providing their offer letter states such.

### **3.4 Teaching Assistants**

The Graduate and Research Committee endorse academic guidelines for new Teaching Assistants that exceed minimum admission requirements. Each TA should satisfy one of the following:

- 1). A GPA of 3.0 or better in the undergraduate major field of study
- 2). A GPA of 3.5 in the senior year major field of study
- 3). Rank in the 85th percentile or higher on the GRE or other standardized test
- 4). A GPA of 3.5 in at least 12 hours of graduate work in the major field.

Exceptions to these guidelines shall be made only with the approval of the Associate Dean.

In addition, each teaching assistant must make normal progress toward a graduate degree. *The definition of normal progress may vary among departments, but the criteria for satisfactory progress are established by the departmental faculty and by the University Graduate and Research Committee.* Teaching assistants who fail to satisfy these criteria are ineligible for reappointment.

All Teaching Assistants whose native language is other than English are required to take the SPEAK (Speaking Proficiency English Assessment Kit) test when they arrive on campus. A score of 230 must be attained in order to work in instructional settings. If a student receives a score in the range 200-229 on the SPEAK that student may serve as a TA if he/she is concurrently enrolled in ESL 4 or ESL 12 until such time as the student gets a score of 230 or greater.<sup>2</sup> Passing a course does not make the student eligible for a teaching assistantship; a score of 230 or higher must still be obtained or the student must continue in ESL coursework for speaking proficiency. If the score is less than 200 on the SPEAK test the student is not eligible for a TA position.

SPEAK tests are individually administered by the ESL Program staff in alternate weeks during the fall and spring, and by appointment during the summer. Contact the ESL Program (32 Coxe Hall, 758-6099, inesl@lehigh.edu) for details and information concerning the SPEAK.

### **3.5 Graduate Assistants**

Graduate students may be appointed to graduate assistantships unrelated to their areas of study on recommendation of the Chairperson of the department concerned. GA's are normally expected to devote half-time to the service of the University and half-time to graduate work. Appointment is for one year and tuition fees are remitted.

In special cases, graduate students may be employed on one-third time under which arrangement two-thirds of the student's time is devoted to graduate work and one-third to service to the University. Tuition fees are not waived for any graduate assistant devoting less than one-half time service to the University.

The availability of these assistantships is based on the needs of individual departments or offices. GA's are employed regularly by the Office of Student Affairs, the Dean of Students Office, the University Counseling Service, Career Services, and the Athletic Department.

### **3.6 Research Assistants/Project Assistants**

Graduate students employed on research projects are designated as either research assistants or project assistants and are not eligible for university benefits. Appointment is offered by the principal investigator or project director in consultation with the Chairperson of the department in charge of the student's curriculum, and is reviewed by the Office of Research and Sponsored Programs. Research assistants are candidates for graduate degrees, devoting full time to a program of graduate work (which may include teaching, research, and other academic activity as well as courses), and are appointed to receive compensation for participating in a research program by which they meet requirements for the degrees sought. Compensation consists of a stipend, and/or tuition fees covered directly from the research project.

Graduate project assistants are appointed by research project directors, in each case in consultation with the Chairperson of the department of the student's curriculum,

<sup>2</sup> See the *Lehigh University course catalog* for a description of these courses.

and upon review by the Contract and Grant Specialists in the Office of Research and Sponsored Programs. Graduate project assistants provide services to research projects for research work that does not fulfill degree requirements.

### **3.7 Scholarships and Fellowships**

Scholarships and fellowships are made to graduate students who demonstrate superior qualifications and performance. There are three types of awards: (1) scholarships that consist of credit hour awards to be applied towards tuition; (2) College and University fellowships that provide both stipend and credit hour awards for tuition; and (3) fellowships that have been designated by a donor for students in a particular engineering discipline. Not all disciplines have these awards. They also consist of a stipend plus credit hour awards for tuition.

In general, credit hour awards consist of nine credit hours per semester. Students who are on maintenance of candidacy status will be awarded the appropriate number of credit hours.

Each year the Dean's Office receives an allocation of tuition credit hours for scholarships. These hours are in turn distributed to the individual departments to use at their own discretion. University fellowships are most often used to recruit outstanding new graduate students rather than to support continuing graduate students. These fellowships are distributed by a University Committee. Fellowships outlined in (3) above are awarded by the individual departments.

### **3.8 Office of Financial Aid**

Students may apply for Stafford loans thru the Office of Financial Aid, 218 W. Packer Ave., ([www.lehigh.edu/~infao](http://www.lehigh.edu/~infao)) 610-758-3181. These funds are awarded on the basis of demonstrated need using the *Free Application for Federal Student Aid* (FAFSA), together with the university application and a copy of the most recent (2007) IRS 1040 and W-2's. The Office of Financial Aid is also required to obtain information on all previous federal student loan borrowing from any other college(s) attended, as well as an indication that there are no prior defaults on educational loans or refund due the government for overpayment of federal aid. To do this, Lehigh will depend on the information that will be displayed on the *Student Aid Report* (SAR), which will be obtained from the *National Student Loan Data System* (NSLDS) after you file the FAFSA. This is a federal requirement.

Students not able to demonstrate "need" may borrow from the *unsubsidized* Federal Stafford Loan Program. Because the Stafford Loans are financed through commercial lenders, their availability is virtually assured *if you qualify*. There is only limited availability of Work-Study for Graduate students. Literature on federal student aid programs is available from the Office of Financial Aid. Particulars on the Federal Stafford Loan (with and without the interest subsidy) are also available from participating lenders. A listing of student "rights and responsibilities" is printed in the section on undergraduate financial aid in the course catalog. The Office of Financial Aid ([www.lehigh.edu/~infao](http://www.lehigh.edu/~infao)) provides a list of lenders on the website, applications for Stafford loans, as well as a listing of commercial education loans together with current interest rates, terms, and conditions of repayment and benefits.

If you are classified as an associate graduate student, which is non-degree classification, you will not be entitled to borrow at the graduate student loan level. You may, however, be eligible to borrow as a fifth year undergraduate on a prorated basis. If you have associate graduate student status, an Office of Financial Aid Loan Coordinator will advise you on your borrowing limits.

A brief summary of loan and work-study options is provided in Table 4. Additional literature (as well as all required forms) are available from the Office of Financial Aid.

Type of Aid	Need Based	Forms Needed	Comments
<b>Federal Stafford Loans:</b>	(Yes) For subsidized portions	FAFSA  University Financial Aid Application	These are loans made to students attending at least half-time (minimum of 6 credits per term with the exception of summer terms and the minimum is 3 credits.) Another exception to this rule is when a student has been certified full time by their department. A graduate student can borrow up to \$20,500 a year (but the maximum that can be subsidized per year is \$8500.00). Whether or not the loan will be subsidized or unsubsidized will be determined by a review of financial information. In some cases a loan will have a portion that is subsidized and a portion that is unsubsidized. The interest rate is the same whether or not the loan is subsidized or unsubsidized but the payment of the interest while a student is in school may be required of unsubsidized portion of loans. One can receive the maximum yearly Stafford Loan amount over two semesters or after the completion of 18 credit hours. Although these are the loan maximums, a student cannot borrow more than the cost of education minus any other financial aid received.
	(No) For unsubsidized portions	Student IRS tax form, all schedules and W-2's	

<b>Graduate Plus Loans</b>	No	All documentation for the Stafford loan as students must have used Stafford Eligibility before applying for this loan	Graduate and professional degree students are eligible to borrow under the PLUS Loan Program up to their cost of attendance minus other financial assistance received. This includes any other loans or financial assistance awarded by the department of study. Applicants for these loans are required to complete the Free Application for Federal Student Aid (FAFSA). They also must have applied for their annual loan maximum eligibility under the Federal Subsidized and Unsubsidized Stafford Loan Program before applying for a Graduate/Professional PLUS loan.
<b>Alternative loans</b>	No	University Financial Aid Application	These loans are applied for and approved by the lenders. All loans are credit based and may require a co-signor. After approval of the loan by the Lender the loan is certified by the Financial Aid Office. A student may borrow up to the cost of attendance.
<b>Federal College Work-Study (FWS)</b>	YES	FAFSA University Financial Aid Application Student's IRS tax form, all schedules and w-2's	These awards are first offered to undergraduates, and are available to graduate students only if funds are available. Job listings and pay scale information are available on the financial aid website, <a href="http://www.lehigh.edu/~infao">www.lehigh.edu/~infao</a> .

*Table 4 Financial aid available to engineering graduate students*

## 4.0 Degree Programs and Requirements

### 4.1 Graduate Degrees Offered

*P.C. Rossin College of Engineering and Applied Science*

#### **Chemical Engineering Department**

Chemical Engineering – M.S., M.E., Ph.D., MBA&E

#### **Civil and Environmental Engineering Department**

Civil Engineering – M.S., M.E., Ph.D., MBA&E  
Environmental Engineering – M.S., M.E., Ph.D., MBA&E  
Structural Engineering – M.S., M.E., Ph.D.

#### **Computer Science and Engineering Department**

Computer Science – M.S., M.E., Ph.D., MBA&E  
Computer Engineering – M.S., Ph.D., MBA&E

#### **Electrical and Computer Engineering Department**

Computer Engineering – M.S., Ph.D., MBA&E  
Electrical Engineering – M.S., M.E., Ph.D., MBA&E  
Wireless and Network Engineering – M.S.

#### **Industrial and Systems Engineering Department**

Industrial Engineering – M.S., M.E., Ph.D., MBA&E  
Quality Engineering – M.S.  
Management Science – M.S.  
Information and Systems Engineering – M.S., M.E.

#### **Materials Science and Engineering Department**

Materials Science and Engineering – M.S., M.E., Ph.D., MBA&E

#### **Mechanical Engineering and Mechanics Department**

Mechanical Engineering – M.S., M.E., Ph.D., MBA&E  
Computational and Engineering Mechanics – M.S., Ph.D.

#### ***Cross Disciplinary Graduate Programs***

Analytical Finance – M.S. \*  
Bioengineering – M.S., Ph.D.  
Energy Systems Engineering – M.E.  
Manufacturing and Systems Engineering – M.S., MBA&E  
Master of Business Administration & Engineering – MBA&E  
Photonics – M.S.  
Polymer Science and Engineering – M.S., M.E., Ph.D., MBA&E  
(Offered within the Departments of Chemical Engineering,  
Materials Science & Engineering, and Mechanical Engineering & Mechanics)

\* Offered jointly with the College of Business and Economics and the Department of Industrial & Systems Engineering.

## **4.2 Academic Standards and Grades**

### **4.2.1 Minimum Academic Standards**

Course grades and their weightings are as follows:

A (4.0), A- (3.7), B+ (3.3), B (3.0), B- (2.7), C+ (2.3), C (2.0), C- (1.7), D+ (1.3), D (1.0), D- (0.7), F (0).

Grades below “C-” will not count towards graduation. Students with more than four courses with grades below “B-” in courses numbered 200 or higher will not be permitted to continue in their program. Pass-fail registration for graduate students is not permitted and grades are not reported for dissertation registration. For degree specific grade requirements please see sections 4.3 and 4.4.

### **4.2.2 Dropping a Course**

A student dropping a course within the first ten days of the semester (five days for summer sessions) will have no record of the course on their transcript. A student dropping all courses for which he or she is registered is considered to be withdrawing from the university and the policy is as noted in University Withdrawal below. A student who drops a course after the tenth day of instruction and before the end of the eleventh week of instruction will have a grade of “W” assigned to the course. A student who drops a course after the eleventh week of instruction and before the end of classes receives a “WP” or “WF” at the discretion of the instructor. A “WF” is considered to be a failing grade. Refunds are calculated on a daily basis according to the Federal Refund Calculation Guidelines. The date used to calculate refunds is based on when a properly authorized withdrawal or drop/add is *received* by the Registrar’s Office.

### **4.2.3 University Withdrawal**

A student withdrawing from the University (dropping all courses during a given term) must submit the Add/Drop form signed by the advisor to the Associate Dean of Graduate Studies & Research Office. A withdrawal from a course within the first ten days of classes is not recorded on the student’s record. Withdrawal after registration day and during the first eleven weeks of instruction will be noted on the academic transcript by assigning a grade of “W” to all courses. A withdrawal after the eleventh week of instruction and before the end of classes will have the grade of “WP” or “WF” assigned for each course at the discretion of the instructor. The date of the withdrawal will be noted on the academic transcript for a withdrawal at any time during the term.

### **4.2.4 Incompletes**

An incomplete grade (N) is used to indicate that one or more course requirements have not been completed. It is the obligation of the student to explain to the satisfaction of the instructor that there are extenuating circumstances (*e.g.*, illness or emergency), which justifies the use of the N grade. If the instructor feels the N grade is justified, he or she assigns a grade of N supplemented by a parenthetical letter grade (*e.g.*, N(B)).

In such cases, the instructor calculates the parenthetical grade by assigning an F (or zero score) for any incomplete work unless he or she has informed the class in writing

at the beginning of the course of a substitute method for determining the parenthetical grade.

*Graduate students have a calendar year to remove course incomplete grades unless an earlier deadline is specified by the instructor. Graduate student incomplete course grades that are not removed remain as N grades on the student's record. Parenthetical grades are not required for thesis or research courses. Thesis or research project N grades may remain beyond one year until the work is completed.*

#### **4.2.5 Absent from the Final Exam**

The X grade is used to indicate absence from the final examination when all other course requirements have been met. The grade in parentheses is determined by including in the grade calculation an F (or zero score) for the missing final exam. The X grade may be removed by a make-up examination if the absence was for good cause (e.g., illness or other emergency). To be eligible for a make-up examination, a graduate student must file a petition and the petition must be approved by the Graduate and Research Committee. The instructor schedules and administers the make-up exam. Parenthetical grades are not required for thesis or research courses.

The XN grade is used to indicate both absence from the final examination and incompleteness of one or more course requirements. The instructor calculates the parenthetical grade using an F (or zero score) for the final examination and either an F (or zero score) or a substitute method of calculation for the incomplete work. The X part of the grade is removed by the procedures described above. Graduate students have a calendar year to complete course work following a N grade unless an earlier completion deadline is specified by the instructor. N grades which are not removed remain on the record of graduate students. All petitions for exceptions are sent to the Graduate and Research Committee. Parenthetical grades are not required for thesis or research courses.

#### **4.2.6 Degree Registration Requirement**

A student must be registered in the semester in which the degree is conferred.

### **4.3 Master's Degree Requirements**

#### **4.3.1 Time and Registration Requirements**

The Master's degree is granted to properly qualified students who complete satisfactorily at least two full semesters of advanced work. **Candidates for the Master's degree have six years in which to complete their programs.** The time to complete the degree begins when the student first registers for courses. Students should confer with their advisors to be certain that specific department and program course requirements are met.

#### **4.3.2 Program for the Master's Degree**

In meeting the requirements for the degree, the student complies with the following regulations:

- 1) Each candidate for the Master's degree must complete the form "Program for Master's Degree," setting forth the courses proposed to satisfy the degree requirements. This program must have the approval of the chairperson of the student's major department. All courses included that are not offered by the student's major department also must be approved by the chairpersons of the departments concerned. The program of courses must be submitted to and approved by the Graduate and Research Committee. Submission should be as soon as possible after 15 credit hours toward the degree have been completed. Approval of the program by this committee signifies that the student has formally been admitted to candidacy for the degree.
- 2) The "minimum" program for the Master's degree includes:
  - not less than 30 credit hours of graduate work; audit credits may not be used toward the degree; research or thesis registration counts as part of the 400-level coursework 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 the major field
  - not less than 15 credit hours of 400-level coursework in the major field
- 3) The 18 credit hours required in the major field are ordinarily taken in one department with exceptions for those programs that are interdisciplinary. Specific exceptions to this rule are mentioned in the departmental statements at the head of course listings. The remaining twelve hours of a "minimum" program, or any part of them, may also be taken in the major department, or they may be taken in any other field in which courses for graduate credit are offered, as the needs or interests of the student may indicate, subject to the approval of the chairperson of the major department. In all cases, the course work for the Master's degree is taken under at least two instructors.
- 4) A graduate student may include in his or her program courses numbered 200 or higher outside the major field and courses numbered 300 or higher in the major field. A graduate student registered in 200 or 300 courses may be assigned additional work at the discretion of the instructors.
- 5) The Master's degree is not granted unless the candidate has earned the grades of "B-" or better in at least eighteen hours of the work on his or her program and in all 300 courses in the major field. No course in which the grade earned is less than "C-" is credited toward the degree.
- 6) All work that is to be credited toward a Master's degree must be done in actual and regular attendance at Lehigh University. 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.

### 4.3.3 Transfer Credits

A maximum of up to nine credits taken at the graduate level elsewhere may be transferred from an accredited graduate college or graduate university to a Lehigh University Engineering Master's Program. All courses must be assigned a grade of "B" or better to be eligible, and have not been used toward any prior degree. The credits must be completed within four years of first enrollment into a Lehigh graduate program. A petition must be submitted to the Registrar along with course descriptions, an official transcript, and the recommendation of the departmental chairperson.

### 4.3.4 Thesis and Comprehensive Examination

Candidates for the Master's degree may be required to submit a thesis or report and/or to pass a comprehensive examination given by the major department. The department specifies whether one, or both of these requirements apply. If a thesis is required it must be based on a research course of at least 3 credit hours, with a maximum of 6 credit hours. The credits to be allowed are fixed by the chairperson of the major department.

University procedures must be followed if the thesis or research project involves human subjects.

The thesis must be prepared according to the rules outlined in Thesis and Dissertation Guidelines. The thesis must be approved by the thesis advisor and the departmental chairperson. The student will submit their approved Thesis to the Registrar **no later than approximately three weeks before the degree award date** using the online submission system found at [www.etsadmin.com/lehigh](http://www.etsadmin.com/lehigh). Check the official University Calendar for the exact date. A binding and microfilming fee must be paid to the Bursar, and the Bursar's receipt must be presented along with a copy of the Thesis title page and abstract including original signatures to the Registrar. If you have any questions about the Thesis submission process please contact the Registrar.

Lehigh accepts no restriction on the right to publish and disseminate Master's degree developed as part of a sponsored or non-sponsored project. A reasonable delay of 90 days is considered to be within the scope of free and open publication. In exceptional cases the delay may be longer, but in no event will Lehigh allow the delay to exceed one year. Furthermore, all theses must be fully accessible to the Graduate and Research Committee and to the faculty.

A checklist of procedures and deadlines is provided in Table 5.

1. Formulation of a tentative program of course work in consultation with your advisor.
2. Filing of Master's Degree program with the Registrar's Office. Submit as soon as 15 semester hour grades are completed. Your department should have a supply of program forms for your use. A program can be revised if a change is necessary.
3. Application for degree in Registrar's Office. Apply before date specified in the catalog. Reapplication for degree is required if the student misses the expected graduation date.
4. Submission of thesis signed by advisor and departmental chairperson. Thesis containing an abstract and a Bursar's receipt is due approximately three (3) weeks before graduation. See the official University calendar.
5. Interdepartmental clearance form is secured through the Registrar's Office and returned to the Registrar's Office after obtaining the appropriate signatures. Cap and gown information is also available through the Registrar, with the completed form returned to the Lehigh University Bookstore.
6. Registration is required in the semester in which the degree is to be conferred. If there are any questions, contact the Associate Dean of Graduate Studies and Research Office (310 Packard Lab, 758-6310).

*Table 5 Steps to receiving the Master's Degree.*

## **4.4 Doctor of Philosophy Degree Requirements**

The degree of doctor of philosophy is conferred on candidates who have demonstrated general proficiency and high attainment in a special field of knowledge and capacity to carry on independent investigation in that field as evidenced by the presentation of an acceptable dissertation embodying the results of original research.

### **4.4.1 Time and Registration Requirements**

A candidate is ordinarily expected to devote three or more academic years to graduate study. In no case is the degree awarded to one who has spent less than two full academic years of graduate work.

Graduate work done in residence at other institutions leading to an advanced degree will be accepted in partial fulfillment of the time requirements, provided such work is approved by the Graduate and Research Committee and by the departments concerned.

Work of fragmentary character scattered over a long period of years, or work completed many years before the student becomes a candidate for the degree, is subject to special review by the University Graduate and Research Committee. The extent to which such work may be credited towards fulfillment of the time requirements will be decided by the committee.

**All post-baccalaureate work toward the doctorate must be completed within ten years.** A student beginning doctoral course-work after an elapsed period of **at least one semester after the Master's has been conferred is granted seven years in which to complete the doctoral program.**

Doctoral students whose graduate study is carried out entirely at Lehigh University must register for a minimum of 72 credits beyond the Bachelor's degree. Students who have earned a Master's degree at another institution must register for a minimum of 48 credits. The proportion of these credits that are to be allocated to courses, research, or dissertation are determined by the individual departments. Transfer credits used for a Master's degree cannot be counted toward the Ph.D. degree. With the exception of those participating in approved dual-degree programs, Lehigh doctoral students may not transfer credits from another accredited college or university to a Lehigh University doctoral program. The exception, however, applies to students enrolled in approved dual-degree doctoral programs involving external institutions, who may transfer up to 25% of their total required doctoral program dissertation / research credits to Lehigh for work that was performed at the external partner institution. Approval of such programs is required by the Dean of the relevant Lehigh College. Audit credits do not count in satisfaction of Ph.D. requirements.

Full-time students working toward the doctorate normally register for a minimum of nine credit hours per semester. If the minimum degree registration requirement of 72 or 48 credits is attained prior to formal admission to candidacy (see Admission to Candidacy, p. 27), continued registration of at least one credit per semester is necessary. In such cases, full-time student status must be certified on the Graduate Registration Form and on the Request for Full-Time Status Certification Form (see Full-time Status p. 5-6) by the Associate Dean of Graduate Studies & Research Office.

After admission to doctoral candidacy, a student must maintain candidacy by registering for at least one credit twice each calendar year. After completion of the minimum registration requirement plus any additional requirements of the student's department or program, registration is permitted for "Maintenance of Candidacy." The tuition charge is for one credit hour. Full-time status again must be certified on the Graduate Registration Form.

#### **4.4.2 Grade Requirements**

Please refer to Academic Standards and Grades & Minimum Academic Standards, for further information.

#### **4.4.3 Concentrated Learning Requirement**

Each Ph.D. candidate must satisfy Lehigh's concentrated learning requirement. The concentrated learning requirement is intended to ensure that doctoral students spend a period of concentrated study and intellectual association with other scholars. Either two semesters of full-time graduate study or 18 credit hours of Lehigh graduate study within a fifteen month period (either on or off campus) must be completed. Individual departments may impose additional stipulations, and candidates should check with their advisers to be certain that they have satisfied their concentrated learning requirements.

#### **4.4.4 Language Requirements**

Language requirements for the Ph.D. are the option of and in the jurisdiction of the candidate's department. Since proficiency in a language is not a University requirement, each department decides which languages, if any, constitute part of the doctoral program. However, students whose native language is not English must demonstrate proficiency.

#### **4.4.5 Qualifying Examinations**

Many departments require students who wish to enroll in doctoral programs to pass qualifying examinations. Since these examinations vary among departments, students should ask their advisors or Departmental Chairpersons for more detailed information. If a qualifying examination is not used, students should find out how and when eligibility to pursue doctoral studies is determined.

#### **4.4.6 Doctoral Committee**

The doctoral committee is a special committee formed to guide the student through the doctoral program. The committee is responsible for assisting the student in formulating a course of study, satisfying specific departmental requirements, submitting a suitable dissertation proposal, overseeing progress in research, and evaluating the completed dissertation.

The process of appointing doctoral committee members varies across departments; however, 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. 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.

#### **4.4.7 Admission to Candidacy**

Candidates for the doctorate are accepted into all departments in the College. A department may limit the number of candidates accepted in any year. In exceptional cases new students may be admitted to candidacy immediately upon registration as a graduate student. Ordinarily, however, they are required to spend at least one semester in residence before they are accepted as candidates.

- 1) Students who enter a Lehigh doctoral program post baccalaureate must complete a minimum of 72 Lehigh credit hours.
- 2) Students who enter a Lehigh doctoral program with a master's degree from another institution must complete a minimum of 48 Lehigh credit hours past the master's degree.

- 3) Students seeking to receive both a master's degree and a doctoral degree must complete a minimum of 72 graduate credits at Lehigh and must meet the requirements of both degrees.

A doctoral student should apply for candidacy in a timely fashion after completion of the Master's degree or its equivalent and after successful completion of the qualifying process as specified by the major department. The prospective Ph.D. candidate must submit to the doctoral committee (see Doctoral Committee above) a written program proposal that includes a discussion of proposed dissertation research. The program should be planned to lead to a general mastery of the major field and to a significant grasp of any minor that may be added. Upon receiving approval of the proposal, the candidate submits the proposal, signed by the committee members, as well as the Application to Candidacy Form to the Graduate Coordinator in the Office of Graduate Studies and Research. The Associate Dean will advise the student in writing of their admission to candidacy.

If the additional registration required is more than 3 credits, the student must register for at least 3 credits until they are within 3 credits of the total credits required (2 or 1 credit(s) remain). When less than 3 credits remain the student then applies for Maintenance of Candidacy two times per year.

If the dissertation research involves human or animal subjects, University procedures must be followed.

#### **4.4.8 General Examinations**

The general examination for the doctorate is designed to test both the student's capacity and his or her proficiency in the field of study. The examination is not necessarily confined to the content of courses that have been taken at Lehigh University or elsewhere. The examination is held, no later than seven months prior to the time when the candidate plans to receive the degree. The student's doctoral committee is in charge of the examination, which may be both written and oral.

Should a candidate fail in the general examination, he or she may be permitted by the doctoral committee to present him or herself for a second examination not earlier than five months after the first. If the results of the second trial are also unsatisfactory, no further examination is set and the candidate is judged to have failed.

#### **4.4.9 Dissertation and Defense**

Ph.D. candidates are required to write a dissertation prepared under the direction of a Lehigh University professor. The dissertation must treat a topic related to the candidate's specialty in the major subject, show the results of original research, provide evidence of high scholarship, and make a significant contribution to knowledge in the field.

Upon approval of the advising professor and one other member of the student's special committee, the dissertation draft is submitted to the College Graduate Coordinator of the Office of Graduate Studies & Research for adherence to format guidelines at least six weeks before the degree is to be conferred. The exact deadline is published in the calendar at the beginning of this handbook. The dissertation must be prepared following the rules outlined in **Thesis and Dissertation Guidelines**. The student should contact the

College Graduate Coordinator at 610-758-6310 to schedule an appointment to hand in the first draft. Upon return of the draft, the student should distribute copies of the draft to the members of the doctoral committee for review and for suggestions for revision.

The candidate then schedules an oral dissertation defense before the doctoral committee, additional faculty members, and the general public. The date of the examination is sent in advance to the Office of the Associate Dean of Graduate Studies & Research. At the end of the defense, members of the student's doctoral committee sign the Report on the Doctoral Dissertation Examination form voting "passed" or "not passed". Passing the defense requires signatures from a majority of the student's committee. After the dissertation has been defended and revised accordingly, the student must go to the university's online dissertation submission website: [www.etsadmin.com/lehigh](http://www.etsadmin.com/lehigh). There the student will create a login ID and password and submit their written dissertation online. A formatting guide and submission guide with simple instructions can be found under the "Campus Resources" link on the site. Should the student have any questions regarding the submission process they may contact the ProQuest Help team that is available through the site or contact the College Graduate Admissions Coordinator at 610-758-6310. Once the student has completed all steps in the submission process and submitted their work, the College Graduate Coordinator will be notified electronically that the work is ready for review. If revisions are needed the student will be notified electronically to log back into the system and make the necessary changes. If the work is suitable for publishing the student will again be notified electronically that their work has been accepted. Along with the online submission there are still some items that must be completed and turned in to the College Graduate Coordinator. These items include:

- 1) A copy of the title page and abstract;
- 2) Written dissertation signature sheet with all committee member's original signatures;
- 3) Original completed Report on the Doctoral Dissertation Examination (from the dissertation defense);
- 4) A receipt from the Bursar for payment of the microfilming fee (\$90);
- 5) Additional forms given to the student at the time he/she submitted the dissertation draft (includes Survey of Earned Doctorates, Commencement Program Information form).

Lehigh accepts no restriction on the right to publish and disseminate dissertations developed as part of a sponsored or non-sponsored project. A reasonable delay of 90 days is considered to be within the scope of free and open publication. In exceptional cases the delay may be longer, but in no event will Lehigh allow the delay to exceed one year. Furthermore, all dissertations must be fully accessible to the Graduate and Research Committee, to the student's dissertation committee, and to other faculty. If you have any questions regarding the Dissertation submission process please contact the College Graduate Coordinator.

A checklist of procedures and deadlines is provided in Table 6.

1	Concentrated Learning requirement: either two semesters of consecutive full-time graduate study (9 credits per semester, spring and fall) or 18 credit hours of graduate study within a fifteen-month period must be completed. Individual departments may impose additional requirements. Candidates should check with their advisors to be certain that they have satisfied their residency requirements.
2	Admission to candidacy: A. approval of composition of special committee (at least 4 members, with one being from outside the department or program). B. application for candidacy signed by members of special committee. C. one original copy of the proposal.
3	Language requirements as specified by the department.
4	General Examination must be passed 7 months prior to graduation.
5	Payment of minimum tuition fee equivalent to 72 credit hours beyond the Baccalaureate or 48 credit hours beyond the Master's degree (obtained from another university or in a different field at Lehigh).
6	Application for degree. Apply on or before date specified in catalog (February 29 <sup>th</sup> for May degree, July 1 <sup>st</sup> for September degree or November 1 <sup>st</sup> for January degree) at the Registrar's Office. Re-application is required if students misses expected graduation date.
7	Dissertation first draft must be signed by the advisor and another committee member. Submit to the Office of Graduate Studies & Research by the relevant deadline. Refer to the University calendar for the exact date.
8	Final dissertation defense examination. Notify the Office of Graduate Studies & Research of this date in advance. You may do this by submitting a copy of your defense announcement.
9	Submission of final dissertation using the online submission system. Submission of Bursar's receipt for the microfilming fee, and other relevant paperwork to the Office of Graduate Studies & Research. Check final submission date in the University calendar at the beginning of this booklet.
10	Interdepartmental clearance form is secured through the Office of Graduate Studies & Research or the Registrar's Office, and returned to the Registrar's Office after obtaining the appropriate signatures. Also, check with the Bursar's Office, Bookstore, Library and Parking Services for any outstanding balances. Be sure to clear any balances due to the university to ensure receipt of your diploma at graduation.

***Table 6: Steps to receiving the Ph.D. degree***

## 4.5 Thesis and Dissertation Guidelines

The thesis or dissertation must conform to the following:

(Complete Proquest publishing guidelines may also be found here:

[http://www.etsadmin.com/UMI\\_PreparingYourManuscriptGuide.pdf](http://www.etsadmin.com/UMI_PreparingYourManuscriptGuide.pdf)

- 1) All straight text is to be double spaced on one side of paper. Double-sided is not acceptable. Quotations, if more than a few lines in length, should be indented from margins and single spaced. Footnotes, tabulations, formulas, *etc.* should likewise be single spaced.
- 2) It is recommended that SI (Système International) units (kg m s) be used throughout. If, however, your discipline uses a different set of units as a standard, use those.
- 3) A left-hand margin of at least 1-1/2 inches shall be allowed for binding. The other margins shall be at least one inch wide. Margins on illustrations, tables, graphs, *etc.*, shall conform to the above. **Page numbers should be at the center bottom without violating the 1-inch margin in typed form, not hand written.** Figure numbers and titles should be placed at the bottom of the page. It is recommended to manipulate each margin by .1" or .2" to ensure correct margins with the final thesis or dissertation.
- 4) Illustrations, tables, graphs, *etc.*, shall be consecutively numbered, so that they may be readily referred to in the context. Figures and tables placed sidewise on the page must be outward facing (facing to the right). The lettering and numbering on graphs and other illustrations shall be typed. Only the major coordinate rulings should appear on graphs.
- 5) A Table of Contents, giving at least the chapter headings, with page numbers, must be prefaced to the thesis or dissertation. If the thesis or dissertation contains a significant number of tables, figures, and plates, they shall be listed as List of Figures or List of Tables. This list will normally follow the list of chapter headings. Check to be sure that the titles on the actual figures, *etc.*, agree with those listed.
- 6) An abstract is to be prepared which will summarize the main findings and conclusions of the thesis or dissertation. As much as possible, the abstract should contain information, not merely an outline of the work done.
- 7) Each thesis or dissertation must have a "vita" or appendix giving a short biography of the candidate. This shall include the place and date of birth, names of parents, institutions attended, degrees (with dates) and honors, titles, or publications, teaching or professional experience, and other pertinent information. The vita must be the last page of the document.
- 8) Samples of the title page and signature sheet for the thesis and dissertation appear following the end of this section.
- 9) The material of the complete thesis or dissertation shall be arranged and numbered as follows:

- the title page (which is page i but is not numbered)
- copyright page (which is page ii)
- blank certificate of approval (iii)
- acknowledgments (if any)
- the table of contents
- list of tables (if any)
- list of figures (if any)
- list of illustrations (if any)

**NOTE: Roman numeral pagination ends here**

- an abstract (arabic numeral 1)

**NOTE: Arabic numeral pagination starts with the abstract at page 1 and is continued in consecutive order to the last page of the thesis or dissertation.**

- the main text of the thesis or dissertation including footnotes, tables and figures
  - list of references cited
  - any appendices
  - the “vita” or brief biography (last page)
- 10) The PDF you upload online is limited to a file size of 100MB and supplementary files are limited to 10MB.
  - 11) No source or object computer program is to be incorporated into the thesis or dissertation. Instead, these should be included in an appendix or submitted through the online submission system as a supplemental file. Proper credit should be given for use made of other programs.
  - 12) The pages of the entire thesis or dissertation, including illustrations, tables, graphs, appendices, and references, shall be numbered as indicated in item 9 above. It is important that every page (except the title page, as noted above) be numbered. There is no other way for the bookbinder or microfilm operator to restore the proper sequence if the pages become separated.
  - 13) There are several referencing styles that can be used in listing books, articles, reports, unpublished materials, and public documents, *etc.* in your set of references. Please consult with your advisor on the appropriate style used in your department. It is important that you maintain consistency with one style throughout your thesis or dissertation. The following list highlights manuals that are excellent guides to referencing styles:

Dodd, J.S. (Ed.) (1986). The ACS style guide: A manual for authors and editors. Washington, DC: American Chemical Society.

Turabian, K.L. (1987). A manual for writers of term papers, theses, and dissertations. (5th ed.). Chicago: University of Chicago Press.

University of Chicago Press. (1982). The Chicago manual of style. Chicago, IL.

# **SAMPLE TITLE PAGE FOR THESIS**

(Title of Thesis)

by

(Your Name)

A Thesis

Presented to the Graduate and Research Committee

of Lehigh University

in Candidacy for the Degree of

Master of Science

in

Name of Program

Lehigh University

(Month and Year Degree will be awarded)

## SAMPLE THESIS SIGNATURE SHEET

This thesis is accepted and approved in partial fulfillment of the requirements for the Master of Science.

---

Date

---

Thesis Advisor

---

Co-Advisor (if any)

---

Chairperson of Department

# **SAMPLE TITLE PAGE FOR DISSERTATION**

(Title of Dissertation)

by

(Your Name)

Presented to the Graduate and Research Committee  
of Lehigh University  
in Candidacy for the Degree of  
Doctor of Philosophy

in  
Name of Program

Lehigh University

(Month and Year degree is awarded)

**SAMPLE APPROVED DISSERTATION DRAFT  
SIGNATURE SHEET**

Approved and recommended for acceptance as a dissertation draft.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Accepted Date

Committee Members:

\_\_\_\_\_  
Dissertation Advisor

\_\_\_\_\_  
Committee Chair  
or other Committee Member

## SAMPLE FINAL DISSERTATION SIGNATURE SHEET

Approved and recommended for acceptance as a dissertation in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Accepted Date

\_\_\_\_\_  
Dissertation Advisor

Committee Members:

\_\_\_\_\_  
Name of Committee Chair

\_\_\_\_\_  
Name of Committee Member

\_\_\_\_\_  
Name of Committee Member

\_\_\_\_\_  
Name of Committee Member

## 4.6 Cross-disciplinary Graduate Study and Research

In addition to offering graduate degrees in academic departments, Lehigh University offers interdisciplinary graduate degrees in the fields of Analytical Finance, Bioengineering, Business Administration and Engineering, Energy Systems Engineering, Manufacturing Systems Engineering, Photonics, and Polymer Science and Engineering.

### 4.6.1 Analytical Finance

The field of analytical finance is a quickly emerging area of study that integrates finance, applied mathematics, computing, and engineering. The M.S. in Analytical Finance program is a joint program between the Department of Industrial and Systems Engineering and the Perella Department of Finance, with strong support from the Department of Mathematics. This program fulfills a market demand for specialists in financial firms who can bridge the gap between financial analysts and technical professionals. The program is designed for two primary groups of students:

- Recent graduates from a mathematically rigorous undergraduate program such as computer science, economics, engineering, finance, mathematics, and the physical sciences. These students will need exposure to graduate topics that prepare them for entry into a first job in financial services and to be upwardly mobile within their firm or industry faster than other entrants without this degree.
- Early-to-mid-career professionals from industry, both to hone and further skills already learned on the job, or to retool their quantitative skills, developing into financial services specialists.

#### For more information contact:

George Wilson  
Professor, Industrial & Systems  
Engineering  
email: grw3@lehigh.edu  
Ph. (610)758-4035

Martin Saffer  
Associate Dean, College of Business &  
Economics  
email: business@lehigh.edu  
Ph. (610)758-5285

Vladimir T. Dobric  
Professor of Mathematics  
email: vd00@lehigh.edu  
Ph. (610)758-3734

Richard Kish  
Professor, Finance and Law  
email: rjk7@lehigh.edu  
Ph. (610)758-4205

URL: <http://www3.lehigh.edu/business/cbegmsanalyticalfin.asp>

## 4.6.2 Bioengineering

### For more information contact:

Dr. Anand Jagota, Director

email: [anj6@lehigh.edu](mailto:anj6@lehigh.edu)

Ph. (610)-758-4091

## 4.6.3 Business Administration and Engineering

Lehigh's interdisciplinary program in Business Administration and Engineering (MBA&E) meets the diverse but converging needs of business and engineering by offering students the chance to acquire a solid foundation in both fields.

Key features of the program include:

- The opportunity to learn skills necessary to achieve a competitive edge in an age when business decisions rarely involve only one area of a company.
- Concentrations in business-finance, management, marketing, and supply-chain management, as well as in chemical, civil, computer, electrical, industrial, manufacturing systems, mechanical, and materials engineering.
- Classes in which students work with a wide variety of other professionals on real-world problems.

Graduates of the MBA&E program will be prepared to assume leadership positions in industrial planning, venture capital and engineering management, and as senior managers in roles requiring both technical and business acumen.

The MBA&E program is designed primarily for students with an undergraduate degree in engineering. Applicants are required to have two years of professional experience and must be accepted by both the P.C. Rossin College of Engineering and Applied Science and the College of Business and Economics. Applicants can, however, take engineering courses while they are fulfilling the work requirement.

Students can choose an appropriate engineering curriculum from any of the following programs – Chemical Engineering, Civil Engineering, Computer Science, Computer Engineering, Electrical Engineering, Industrial Engineering, Mechanical Engineering, Materials Science & Engineering and Polymer Science & Education.

Each engineering program has its own set of core courses. Course choices are intended to be as flexible as possible, and are tailored to meet the needs of individual students.

**Further information can be obtained from:**

John P. Coulter  
Associate Dean of  
Graduate Studies and Research  
P.C. Rossin College of  
Engineering and Applied Science  
Phone: (610) 758-6310  
email: jc0i@lehigh.edu  
URL: [http://www3.lehigh.edu/  
engineering/academics/mbae2.asp](http://www3.lehigh.edu/engineering/academics/mbae2.asp)

Martin Saffer  
Associate Dean  
College of Business and Economics  
Phone: (610) 758-5285  
email: [business@lehigh.edu](mailto:business@lehigh.edu)  
URL: [http://www3.lehigh.edu/business/  
academics/mbaeng.asp](http://www3.lehigh.edu/business/academics/mbaeng.asp)

#### **4.6.4 Energy Systems Engineering**

As part of Lehigh's Energy Systems Engineering Initiative, the mission of the new graduate degree program is to invigorate the pipeline of new engineering graduates interested in energy oriented careers and thus produce a new generation of technical leaders for the energy and power industries. As a graduate of this program, you will have acquired a level of specialized knowledge and experience such that you are readily able to tackle the challenges facing the U.S. utility infrastructure, its operations, and its environmental impact.

The 10-month, thirty-credit multi-disciplinary professional Master's degree program in Energy Systems Engineering will consist of three components:

- [Core Courses](#) (12 credits)
- [Technical Electives](#) (15 credits)
- [Industry Project](#) (3-6 credits)

**For more information contact: Dr. Andrew J. Coleman**

Director of Energy Systems Engineering Institute

Lehigh University

13 E. Packer Ave.

Fritz Engineering Lab

Bethlehem, PA 18015

email: [ajc390@lehigh.edu](mailto:ajc390@lehigh.edu)

Ph. (610)-758-3529

## 4.6.5 Manufacturing Systems Engineering

Lehigh's cross-disciplinary graduate program in manufacturing systems engineering (MSE) allows students to integrate systems perspectives with interdisciplinary education, combining the academic study of engineering and business with project work, and topical industry-related research activities. Professional engineers, scientists, and managers can earn the degree in two years of part-time study. Key features of the program include courses in agile and lean manufacturing, e-commerce, international supply-chain management, sustainability, and other current topics that are immediately applicable in the workplace.

Thirty credits are required for the M.S. in MSE. A forty-five credit MBA&E degree with an MSE concentration is available. Faculty affiliated with the program represent the academic departments in the Rossin College of Engineering and Applied Science, the College of Business and Economics, and the College of Arts and Sciences. All have extensive backgrounds in technology transfer with industry.

### **For more information contact:**

Carolyn C. Jones, Program Coordinator  
200 West Packer Avenue, Bethlehem, PA 18015  
Ph: 610-758-5157; email: ccj1@lehigh.edu  
[www.lehigh.edu/~inmse/gradprogram/](http://www.lehigh.edu/~inmse/gradprogram/)

## 4.6.6 Photonics

The Masters of Science Degree in Photonics is an interdisciplinary degree that is designed to provide students with a broad training experience in the various aspects of photonics, including topics in Physics, Electrical Engineering, and Materials Science & Engineering. Admission to the program requires a B.S. or M.S. in the Physical Sciences or in Engineering. Some departments may also require the GRE. International students must satisfy minimum university language requirements.

Applications should be directed to one of the three sponsoring departments (Electrical and Computer Engineering, Materials Science and Engineering, or Physics). Procedures and admission criteria are the same as that followed by the home department. The admissions process will be under the supervision of an inter-departmental coordinating committee chaired by the program director.

### **For more information contact:**

Dr. Yujie Ding  
Electrical & Computer Engineering  
email: yud2@lehigh.edu  
Ph. (610) 758-4582

Dr. Himanshu Jain  
Materials Science & Engineering  
email: hj00@lehigh.edu  
Ph. (610) 758-4217

*URL: [www3.lehigh.edu/engineering/academics/photonics.asp](http://www3.lehigh.edu/engineering/academics/photonics.asp)*

## 4.6.7 Polymer Science and Engineering

Lehigh has a diverse group of faculty members with a strong, primary interest in research in this interdisciplinary field, activities are coordinated through the Center for Polymer Science and Engineering (CPSE), and its academic polymer education committee. Polymer faculty from the traditional departments of chemical engineering, chemistry, materials science and engineering, physics, and mechanical engineering and mechanics are participants in CPSE.

There are two ways in which qualified graduate students, with degrees in the above or related fields, may participate. They may pursue graduate studies within an appropriate department. Departmental procedures must be followed for the degree sought. The student's advisor may be in that department, or in another department or research center. In this case, the student receives the normal departmental degree, with emphasis in polymer courses and research.

Alternatively, students may elect to pursue studies toward an interdisciplinary M.S. or Ph.D. degree in Polymer Science and Engineering. The procedures for this latter case are outlined in the Lehigh University course catalog.

### For more information contact:

Dr. Raymond A. Pearson, Director  
Center for Polymer Science and Engineering  
Professor, Department of Materials  
Science & Engineering  
Lehigh University  
5 East Packer Avenue,  
Whitaker Laboratory  
Bethlehem, PA 18015  
email: rp02@lehigh.edu  
Ph. (610) 758-3857

Dr. James E. Roberts, Chairperson  
Polymer Education Committee  
Professor, Department of Chemistry  
Lehigh University  
6 East Packer Avenue,  
Seeley G. Mudd Building  
Bethlehem, PA 18015  
email: jer1@lehigh.edu  
Ph. (610) 758-4841

URL: [https://fp2.cc.lehigh.edu/inpolctr/cpse\\_home\\_page.htm](https://fp2.cc.lehigh.edu/inpolctr/cpse_home_page.htm)

## 4.6.7 Research Centers and Institutes

Lehigh has developed a number of centers and institutes to provide greater research and academic opportunities for graduate students and faculty. Centers and institutes are generally interdisciplinary and complement the scholarly activities of

academic departments and represent scholarship and research based on the expertise and capabilities of a group of faculty members.

**Biopharmaceutical Technology Institute**

Contact: James T. Hsu, Director  
Lehigh University  
111 Research Drive  
Bethlehem, PA 18015  
Email: [jth0@lehigh.edu](mailto:jth0@lehigh.edu)  
Phone: (610)758-4257  
URL: [www.lehigh.edu/~jth0/bti.html](http://www.lehigh.edu/~jth0/bti.html)

**Center for Advanced Materials and Nanotechnology (CAMN)**

Contact: Martin P. Harmer, Director  
Lehigh University  
5 East Packer Avenue  
Bethlehem, PA 18015  
Email: [mph2@lehigh.edu](mailto:mph2@lehigh.edu)  
Phone: (610)758-4227  
URL: [www.lehigh.edu/nano/](http://www.lehigh.edu/nano/)

**Center for Manufacturing Systems Engineering**

Contact: Keith M. Gardiner, Director  
Lehigh University  
200 West Packer Avenue  
Bethlehem, PA 18015  
Email: [kg03@lehigh.edu](mailto:kg03@lehigh.edu)  
Phone: (610)758-5157  
URL: [www.lehigh.edu/~imse/gradprogram/](http://www.lehigh.edu/~imse/gradprogram/)

### **Center for Optical Technologies**

Contact: Thomas L. Koch, Director  
Lehigh University  
7 Asa Drive, 205 Sinclair  
Bethlehem, PA 18015  
Email: tkoch@lehigh.edu  
Phone: (610)758-2601  
URL: [www.lehigh.edu/optics](http://www.lehigh.edu/optics)

### **Center for Polymer Science and Engineering**

Contact: Raymond A. Pearson, Director  
Lehigh University  
111 Research Drive  
Bethlehem, PA 18015  
Email: rp02@lehigh.edu  
Phone: (610)758-3857  
URL: [https://fp2.cc.lehigh.edu/inpolctr/cpse\\_home\\_page.htm](https://fp2.cc.lehigh.edu/inpolctr/cpse_home_page.htm)

### **Center for Value Chain Research**

Contacts: Joel Sutherland, Managing Director  
Email: jos206@lehigh.edu Phone: (610)758-6428  
Lawrence V. Snyder, Co-Director  
Email: lvs2@lehigh.edu Phone: (610)758-6696  
Michael D. Santoro, Co-Director  
Email: mds8@lehigh.edu Phone: (610)758-6414

Lehigh University  
200 West Packer Avenue  
Bethlehem, PA 18015  
URL: [www.lehigh.edu/~inchain/](http://www.lehigh.edu/~inchain/)

### **Chemical Process Modeling and Control Research Center**

Contacts:        Mayuresh Kothare, Co-Director  
                      Email: mvk2@lehigh.edu  
                      William Luyben, Co-Director  
                      Email: wll0@lehigh.edu  
                      Lehigh University  
                      111 Research Drive  
                      Bethlehem, PA 18015  
                      Phone: (610)758-6654  
                      URL: www.lehigh.edu/~inpmc

### **Emulsion Polymers Institute**

Contact:         Eric Daniels, Executive Director  
                      Lehigh University  
                      111 Research Drive  
                      Bethlehem, PA 18015  
                      Email: esd0@lehigh.edu  
                      Phone: (610)758-3602  
                      URL: [https://fp2.cc.lehigh.edu/inemuls/epi/epi\\_home\\_page.htm](https://fp2.cc.lehigh.edu/inemuls/epi/epi_home_page.htm)

### **Energy Research Center**

Contact:         Edward K. Levy, Director  
                      Lehigh University  
                      117 ATLSS Drive  
                      Bethlehem, PA 18015  
                      Email: ek10@lehigh.edu  
                      Phone: (610)758-4090  
                      URL: www.lehigh.edu/energy

**Engineering Research Center for Advanced Technology for Large Structural Systems (ATLSS)**

Contacts: Richard Sause, Director  
Email: rsause@lehigh.edu Phone: (610)758-3525  
James Ricles, Deputy Director  
Email: jmr5@lehigh.edu Phone: (610)758-6252  
Robert P. Alpage, Administrative Director  
Email: rpa2@lehigh.edu Phone: (610)758-6107  
Lehigh University  
117 ATLSS Drive  
Bethlehem, PA 18015  
URL: www.atlss.lehigh.edu

**Enterprise Systems Center (ESC)**

Contacts: Emory W. Zimmers, Jr. , Director  
Email: ewz0@lehigh.edu Phone: (610) 758-4034  
Joan Fox, Financial Coordinator  
Email: jef2@lehigh.edu Phone: (610) 758-4955  
Lehigh University  
200 West Packer Avenue, Mohler Lab  
Bethlehem, PA 18015  
URL: www.lehigh.edu/~inesc/

**Institute for Metal Forming**

Contact: Wojciech Misiolek, Director  
Lehigh University  
5 East Packer Avenue  
Bethlehem, PA 18015  
Email: wzm2@lehigh.edu  
Phone: (610)758-4252  
URL: www.lehigh.edu/~inimf

**International Materials Institute for New Functionality in Glass**

Contact: Himanshu Jain, Director  
Lehigh University  
7 Asa Drive  
Sinclair Laboratory 120A  
Bethlehem, PA 18015  
Email: h.jain@lehigh.edu  
Phone: (610)758-4217  
URL: www.lehigh.edu/imi/

**(NSF) Center for Engineering Logistics and Distribution (CELDI)**

Contacts: Emory W. Zimmers Jr., Director  
Email: ewz0@lehigh.edu Phone: (610) 758-4034  
Joan Fox, Associate Director  
Email: jef2@lehigh.edu Phone: (610) 758-4955  
Lehigh University  
200 West Packer Avenue, Mohler Lab  
Bethlehem, PA 18015  
URL: www.lehigh.edu/~inceldi/

**Sherman Fairchild Center for Solid State Studies**

Contact: Marvin H. White, Director  
Lehigh University  
16A Memorial Drive East  
Bethlehem, PA 18015  
Email: m.white@lehigh.edu  
Phone: (610)758-4421  
URL: www.lehigh.edu/~insfl/sfc.html

## **5.0 Additional Supporting Offices Information**

### **5.1 Office of International Students & Scholars**

#### **5.1.1 Advising Services**

OISS provides immigration advice to students and scholars on an individual basis on non-academic matters. Advice on immigration includes general information as well as specific information on USCIS transfer of schools, extension of stay, work permission, and practical training experience.

The OISS staff is available to give support and advice on such matters as housing, family concerns, financial questions, personal difficulties, etc. We welcome and encourage international students and scholars to visit our office.

#### **5.1.2 Resource Center**

The International Students and Scholars Office serves as a resource center for the international community, and maintains a bulletin board on the network server with vital international news and information.

**Visit our website:** <http://www.lehigh.edu/~intl/>

**Visit our office:** 32 Sayre Drive, Coxe Hall 1<sup>st</sup> Floor

**Phone:** 610-758-4859

**E-mail:** Intl@lehigh.edu

**Hours:** Mon- Fri. 9:00am - 4:00 pm

#### **5.1.3 International Programs**

The Global Union presents more than 50 international educational, cultural and social programs each year for the Lehigh community.

#### **5.1.4 Office of International Students & Scholars Personnel**

- |   |        |          |
|---|--------|----------|
| • Gisela M. Nansteel, Director              | gmn0   | 758-4859 |
| • Jeanne Tan, International Student Advisor | jet206 | 758-4873 |
| • Bonnie Beidleman, Secretary               | bjba   | 758-4859 |

### **5.2 Office of Graduate Student Life**

#### **5.2.1 Mission Statement**

The Office of Graduate Life is a division of Student Affairs. Our mission is to make Lehigh a hospitable place that is engaging, inspiring, and supportive to graduate students. The Director's duties and responsibilities are to:

- Serve as principal liaison with graduate students through regular meetings with the GSS executive board (e-Board), attendance at GSS meetings, and individual student consultations;
- Maintain liaison with key campus constituents, promote awareness of graduate student issues, and coordinate services to better address graduate student needs;
- Collect and analyze information in conjunction with the Institutional Research Office for strategic planning purposes;
- Foster the development of appropriate social, cultural, intellectual, and recreational opportunities for graduate students;
- Serve as a primary advocate for graduate student life issues within Student Affairs; and
- Develop and coordinate graduate student orientation and TA training.

### **5.2.2 Contact**

- Kathleen Hutnik, Ph.D., Director  
Office of Graduate Student Life  
217 West Packer Avenue  
  
Lehigh University  
Bethlehem, PA 18015  
(610) 758-3648; Fax (610) 758-6971  
<http://www.lehigh.edu/~ingrador/>

### **5.2.3 Graduate Student Life Guidebook**

The Graduate Student Life Guidebook contains information that this handbook does not include, but is important for Graduate Students to review and understand. A downloadable version is available at the Graduate Student Life website. The areas of the Graduate Student Life Guidebook (partially taken from the table of contents) are:

#### **Academic Assistance**

- Center for Writing, Math, and Study Skills
- Support for Students with English as a Foreign Language

#### **Arts, Entertainment, and Recreation**

- Free or Inexpensive On Campus & Off Campus Festivals
- Historical Sites and Museums

**Automobiles**

- Campus Parking Services
- Bad Weather and Parking on Campus

**Bookstore****Children**

- Childcare

**Computing****Confidential Ethics Hotline****Gay, Lesbian, Bisexual, and Transgendered Ally Program****Graduate and Research Committee (GRC)****Graduate Student Center**

- Graduate Life Office

**Health, Wellness & Mental Health****Housing**

- On-Campus Residential Services
- Off-Campus Housing

**Identification Cards****International Student Resources**

- Office of International Students and Scholars
- Global Union
- English as a Second Language

**Laundromats****Legal Resources****Library Resources****Media Resources****Money**

- Financial Aid Office
- Job Listings

**Multicultural Student Resources****Ombudsperson****Professional Development and Advancement****Religion**

## **Restaurants Near Campus**

## **Safety**

## **Shopping**

## **Telephones**

- Long Distance Telephone Carriers

## **Transportation**

- On Campus Transportation
- Off Campus Transportation (airplanes, taxis, and buses)

## **Volunteering**

## **University Policies**

## **Women's Resources**

## **University Regulations**

## **University Student Judicial System**

- Authority and jurisdiction

## **Code of Conduct**

- Categories of Offenses Covered by this Code
- Emergency Situations
- Disciplinary Sanctions for Individuals

## **Guidelines for Sanctions**

- Disciplinary Procedures

# Index

## A

Academic Awards 14  
Academic Standards 21-22  
Academic Year Calendar iv - v  
Admissions 1  
Application for Degree 8  
Associate Graduate Students 2-3  
Auditing a Course 7

## C

(Admission to) Candidacy 27-28  
Clearance 9  
Concentrated Learning Requirement 26  
Cross-disciplinary Graduate Study &  
Research 39-48

## D

(Graduate) Degrees Offered 20  
Dissertation & Defense 28-30  
Dissertation & Thesis Guidelines 31-38  
Doctoral Committee 27  
Dropping a Course 21

## F

Financial Aid 14-19  
(Office of) Financial Aid 17-18  
Full-time Status 5-6

## G

General Examinations 28  
Graduate Assistants 14-15, 16  
(Office of) Graduate Student Life 49-52  
Graduation 8-9

## H

Humane Care & Treatment of  
Laboratory Animals 12-13  
(Protection of) Human Subjects in  
Research 11-12

## I

Incompletes 21-22  
Intellectual Property 13  
(Office of) International Students &  
Scholars 49

## L

Language Requirement 27  
Late Registration Penalties 7  
Lehigh University Undergraduates 4  
Living Accommodations 11

## M

Maintenance of candidacy 7, 27-28

## N

Non-degree Graduate Students 3-4

## O

(Graduate Student) Orientation 4-5

## P

(Graduate Student) Petitions 8  
Ph.D. requirements 25-30  
Pre-registration 6  
Program for Master's Degree 22-23

## **Q**

Qualifying Examination 27

## **R**

Readmission 4

Registration 5-7, 9, 22, 25-26

Regular Graduate Students 1-2

(Office of) Research & Sponsored  
Programs 11-13

Research / Project Assistants 16-17

## **S**

Schedule Limitations 5

Scholarships & Fellowships 17

Summer Appointments 15

## **T**

Teaching Assistants 14-16

Thesis & Comprehensive Examination 24

Thesis & Dissertation Guidelines 31-38

Transfer Credits 24

Tuition & Fees 9-10

Tuition Payment 10

Tuition Refunds 10

## **W**

(University) Withdrawal 21

## NOTES

This Graduate Student handbook is prepared and issued by the Dean's Office, P.C. Rossin College of Engineering and Applied Science. It is intended to serve as a reference for graduate students and for those involved in graduate education in the P.C. Rossin College at Lehigh University. The original source for some of the procedures and policies listed herein is the Rules and Procedures of the Faculty issued by Lehigh University. The Office of Financial Aid provides information on financing graduate education. The University reserves the right to change at any time the rules governing admission, tuition and fees, courses, the granting of degrees, or other regulations affecting graduate students.

Every attempt has been made to provide accurate and timely information of use to the graduate community. Oversights or mistakes should be brought to the attention of John P. Coulter, Associate Dean of Graduate Studies and Research, P.C. Rossin College of Engineering and Applied Science, 310 Packard Laboratory, 758-6310, [ineas@lehigh.edu](mailto:ineas@lehigh.edu).