

**Princeton University**

**Department of Operations Research and Financial Engineering**

**Graduate Handbook**

**2005-06 Academic Year**

## **Message from the Chair**

Welcome to the Department of Operations Research and Financial Engineering. It is my hope that you will strive to make your graduate study successful. Your success is our success. In addition to your academic work, I hope you will take some time to explore the historical riches of Princeton University as well as the Princeton community at large.

## **Message from the Director of Graduate Studies (DGS)**

Princeton is a small school where close interaction with advisers is encouraged. It is important that you establish a close working relationship with your adviser. If you feel that this is not happening, or you are having problems with your adviser, see me.

- **ME Degree Requirements**

A candidate fulfills the requirements of this program by successfully completing eight courses. A thesis is not required. The following is a recommended study plan. Please go over the plan with your adviser and make alterations as you deem appropriate in view of your background and interests. Also below is a list of courses you may find desirable as substitute courses.

<b>Sample Study Plan for ME</b>			
<b>Fall</b>	ORF 411	<b>Spring</b>	ORF 401
	ORF 505		ORF 526
	ORF 522		Elective
	Elective		Elective

**Other courses of interest:**

ORF 417, 467, 507, 508, 523, 549, ELE 591/ORF 591  
 ECO 310, 363, 317, 463, 414, 513  
 MATH 314  
 WWS 505

- **MSE Degree Requirements**

The program requires, as a minimum, 10 courses in two years plus a master's thesis. In particular, ORF 509 and 510 must be taken (and can be included in the required 10 courses). The following is a recommended study plan. Make alterations as you deem appropriate, subject to the approval of your adviser, depending on your background and interests. With the permission of the Director of Graduate Studies, students may do a master's thesis under the direction of an adviser out of the department.

<b>Sample Study Plan for MSE</b>			
<b>First Year:</b>			
<b>Fall</b>	ORF 505	<b>Spring</b>	ORF 509
	ORF 522		ORF 523
	ORF 526		ORF 527
	Elective		ORF 534
<b>Second Year:</b>			
<b>Fall</b>	ORF 510	<b>Spring</b>	ORF 570
	Elective		Elective

- **ORF 509/510 Requirements**

ORF 509 and ORF 510 are directed research. Under the direction of a faculty member, PhD and MSE students carry out research, write a report each, and present the results. Of these, 509 is normally taken during the spring semester of the first year of study and 510 during the fall semester of the second year of study. Doctoral students should complete 510 one semester prior to taking the general examination.

- **PhD Qualifying and General Examinations**

The requirements for the PhD degree include the passing of a qualifying and general examination, presentation of an acceptable thesis, and passing the final oral examination (thesis defense).

### 1. Qualifying Examination Procedure

This exam will occur at the beginning of the student's second year at Princeton University. Before the exam, the student must have acquired demonstrated competence in real analysis at the level of MATH 314. The exam itself consists of two written exams, one on optimization and one on stochastics. The two exams will be given on two consecutive days in September of the student's second year. The dates will be announced in advance.

The Optimization Exam will be based on ORF 522 and ORF 523. The Stochastics exam will be based on ORF 526 and ORF 527. Each exam will be prepared by a committee of faculty members appointed by the Department Chair. In addition to testing the student's mastery of the subject matter, each exam will endeavor to test the student's ability to combine disparate topics in novel ways in order to solve complex problems.

Both of the written exams are of the open-book, open-notes variety. The exam questions will be handed out by 9:00 AM of the appointed day, and the written responses will be picked up by 5:00 PM the same day. The department will provide refreshments and lunch.

The results of the qualifying exam are determined by a formal vote of the faculty. For each student, there are three possible outcomes:

- A) Student passes the exam,
- B) Student fails the exam but is given the option to retake the exam later during the same semester, or
- C) Student fails the exam and must transfer out of the PhD program.

In case C, we anticipate that the student will be able to continue in one of the masters programs, provided that the faculty votes to accept such a continuation of the student's education. If the student is deemed unprepared for continuing graduate education in ORFE, he or she will be required to withdraw immediately.

### 2. General Examination Procedure

Typically, ORFE students take the general exams at the end of their second year at Princeton University. By that time, the student must have passed the qualifying exam, have taken ORF 509 and ORF 510, and have shown adequate progress on research and an acceptable level of understanding of his or her area of specialization.

The general exam consists of two parts, one written and one oral, both covering the student's primary area of specialization. For each student, an examining committee is appointed by the Department Chair. The committee is to consist of the student's adviser plus at least two ORFE faculty. The committee will prepare the written exam and administer the oral one, evaluate the student's performance in both parts, and make a recommendation to the department faculty. A departmental faculty vote determines the final outcome.

The *written part* is a 9:00 AM to 5:00 PM exam of the open-book, open-notes variety. Its further details will vary from

student to student, depending on the student's examining committee. Its date will be announced in advance, and refreshments and lunch will be provided by the department.

The written test prepared by the committee should reflect the student's primary research interests and must cover the contents of at least two courses in the student's research area. These two must be advanced courses, other than 509, 510, 522, 523, 526, 527.

Each student is advised to discuss the exam with his or her adviser. The adviser should recommend to the Department Chair the other members of the Exam Committee. Once formed, the committee should determine the two courses involved and further details of the written exam as well as the date and structure of the oral exam.

The oral part is approximately three hours in duration. For its preparation, the student is required to submit a comprehensive written report on the research done in ORF 509-510. This report is due at 9:00 AM on the first day of the written examination and serves as the basis for a research presentation by the student as the first hour of the oral examination. Examining faculty may ask questions on this material, on the material contained in the written exam, and on any material deemed appropriate for a comprehensive examination.

The possible outcomes of the general exam are as follows:

- A) Student passes the exam and is admitted to PhD candidacy,
- B) Student fails the exam, but he or she is given the option to retake the exam at a future date, or
- C) Student fails the exam and must withdraw from the PhD program.

As mentioned earlier, the ORFE faculty determine the outcome based on the recommendation of the examining committee. In case C, the student is usually given the MA degree and must terminate unless the faculty recommends otherwise.

- **Research Advising Committee for PhD Candidates**

Upon sustaining the General Examination, a doctoral student will be assigned a research committee of three, composed of the student's adviser plus two other advisory faculty members. This committee serves in an academic capacity so that the student's adviser is not the only individual aware of and concerned with academic progress.

The committee is required to meet with the student once per academic year to review progress and changes in scope of the research. In some instances, a redirection of the research might warrant a change in the composition of the committee to ensure that the student's needs are served best. The prime responsibility for providing guidance and direction to the work will remain with the adviser.

During the academic year after passing the General Examination, the student will present a seminar to this committee describing the proposed area of research, the background work completed in preparing for the research effort, the intended avenues of investigation, specific problems with the work the student feels are likely to cause the most difficulty, and the aspects of the work that will require the most guidance. The purpose of this interchange is to provide the student and the adviser some assistance in assuring that the research proceeds in a fruitful direction.

- **Dissertation and Post-Generals Courses**

Usually completion of a suitable dissertation takes two to three years beyond the general examination. During those years the student is encouraged to select an area outside his/her specialty and to broaden his/her base of knowledge by enrolling in courses in that area. It is also expected that additional courses will be taken related to the student's specialty area. Upon completion and acceptance of the dissertation by the department, the candidate will be admitted to the final public oral (FPO) examination.

- **Academic Regulations/Fraud**

The Graduate School is becoming increasingly concerned about academic fraud. Please take time to read information on "General Requirements for the Acknowledgment of Sources in Academic Work" and "Definitions of Academic Violations Under the Jurisdiction of the Faculty-Student Committee on Discipline" contained in "Rights, Rules and Responsibilities".

Upon entering Princeton you also received information concerning this important subject. This information is furnished to make you aware of your responsibilities regarding University requirements on acknowledgment of sources and academic fraud. The department joins with the Graduate School in taking a strict stance in this area.

- **Changes in Course Status**

Any changes (grading options, dropping or adding courses etc.) that you may need to make to your registered courses, **must be filled out on a Course Change Form.**

You may change your status in a course **no later than two weeks prior to the last day of the regularly scheduled class of the semester.**

- **Leave of absence**

Approval of adviser and DGS--forms are online. There are a variety of leaves available. (*Graduate School Announcement, p. 23*).

- **Part-time employment**

*The following employment policy is quoted from the Princeton University Graduate School Announcement, 2005-06 p. 20:*

The Graduate School considers employment beyond a maximum full-time assistantship of 18 to 20 hours per week incompatible with full-time graduate study. If students and their departments judge that part-time employment is both manageable and necessary, however, the students may be employed either on campus or off campus (and wherever possible under the Graduate Work-Study Program). These arrangements must be approved by the departmental director of graduate studies and the student's dissertation adviser. International students are limited by U.S. federal regulations to 20 hours of employment while school is in session (including assistantship in instruction/research appointments and any on-campus work). International students may not accept off-campus employment without authorization from either the U.S. Citizenship and Immigration Service or their J-1 program sponsor. International students should contact the international graduate student adviser at the Office of Visa Services, 120 Alexander Rd, web.princeton.edu/sites/visa.

Historically, in addition to being employed as AR's and AI's by the Department, graduate students have intermittently been involved in employment elsewhere. It is the concern of the Department that, at times, this latter type of employment is neither manageable nor necessary and, in fact, is incompatible with full-time graduate study. Therefore, the Department feels it is important to ensure the awareness of the above employment policy. Included in this policy is consulting projects. All employment other than an AR or AI is subject to review by the Director of Graduate Studies.

Students must seek approval of part-time employment opportunities by filing a Request for Part-time Employment Form for review by the Departmental Director of Graduate Studies.

- **Assistants in Instruction (AI's)**

Before they can be appointed as AI's, international students will have

- i) to pass the test of English as a Second Language (ESL) administered by the Graduate School, and
- ii) to complete any required ESL courses.

- **Level of effort expected**

Students being supported as AIs or ARs are expected to spend at least 20 hours per week. Students are expected to work full time between the hours of 9:00 AM to 5:00 PM except when in class; homework can be done in the evenings and weekends.

- **Auditing Courses**

1. Courses selected by **Pre-generals** and **Masters** students **must** be taken for a letter grade and cannot be audited.
2. **Post-generals** students may sign up for courses as audit.
3. **Post-generals students** may take courses on a pass/fail (P/F) basis with the approval of their adviser and the course instructor. Generally, courses taken on a P/F basis should be outside of the student's primary area of interest.

- **Holiday/Vacation Time**

Students who are AIs or ARs are treated in the same manner as staff members. The university vacation schedule must be followed; you are expected to be working at the university on all days that the University is open, unless you are formally taking vacation days. The absence of classes should not excuse you from being on campus. Get prior approval from your research adviser for all vacation days. Students on AI support must get the permission of the DGS and the instructor in charge of the course.

<p><b>Thanksgiving</b>, Thursday and Friday, November 24, and 25, 2005 <b>Christmas</b>, Monday, December 26 and Tuesday, December 27, 2005 <b>New Year's</b>, Friday, December 30, 2005 and Monday, January 2, 2006 <b>Memorial Day</b>, Monday, May 29, 2006</p>
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**Holiday Party** – Friday, December 16, 2005 - 5:00-8:00 PM

Your presence at these two events will be appreciated.

## Miscellaneous

**Academic Administrative Offices-** AKA Student Affairs Office, Room 218; ext. 8-4018.

**Stipend checks** will be put in your mailbox on the last working day of the month except December and June when checks come out earlier.

**Mailboxes** are located in the Student Lounge, Room E-214. PLEASE CHECK YOUR MAILBOX DAILY. Packages will be in the mailroom, E-208.

**Telephones** All the rooms have telephones. Local calls are free. In case of an emergency and you want to make a long distance call, please contact the Department Manager, Connie Brown for a code number.

**E-mail**, most communication is by e-mail. PLEASE check your e-mail regularly.

### **Student Lounge/Kitchen**

**Student Lounge** is located in room E-214. It is available to both graduate and undergraduate students in ORFE and CEE departments. Mailboxes for returning papers and homework assignments are located in the lounge as well. You may eat your lunch in the lounge. Remember to clean up after your use and dispose food in the kitchen waste bin, not in the student lounge.

**Kitchen-** The Department provides the use of a fully equipped kitchen to faculty, staff and students. This is a common area shared by all. Do not take food other than your own from the fridge and please do not keep food for more than two days. Clean up after your use of the microwave. There is a coffee vending machine in the kitchen. A cup costs 25¢. Bring your own mug.

**Bulletin boards.** The Grad info board is outside the academic administrative offices. There are also two seminar notice boards outside of the Department Administrative Office Room, E-220. Information on current fellowships, scholarships, grants, call for papers, etc. to which students may apply is posted here.

**Vending machines** are located in the corridor exit downstairs.

## Sources of useful information

Rights, Rules, Responsibilities

A Guide for Graduate Students

A Guide for International Graduate Students

Student Employment

A Guide to Your Campus Health Services

Student Health Plan  
For Off-campus Care

## Restaurant Information

### Selected Area Restaurants/Take-out (Close to the E-Quad)

#### **George's Roasters & Ribs**

244 Nassau Street - 609-252-0419

#### **Kalluri Corner**

235A Nassau Street – 609-688-8923

#### **Old World Pizza**

242 1/2 Nassau Street - 609-924-9321

#### **Ivy Garden**

238 Nassau Street - 609-921-2388

#### **Thai Village**

235 Nassau Street - 609-683-3896

#### **Tiger Noodles**

260 Nassau Street - 609-252-0663

## Other Area Restaurants

**Alchemist & Barrister** (*Contemporary Cuisine*)

28 Witherspoon Street - 609-924-5555

**Annex** (*International Cuisine*)

128 1/2 Nassau Street - 609-921-7555

**Ferry House** (*Contemporary Cuisine*)

32 Witherspoon Street - 609-924-2488

**Hunan** (*Hunan & Szechuan Chinese Food*)

157 Witherspoon Street - 609-921-6950

**Ichiban** (*Japanese Cuisine*)

66 Witherspoon Street 609-683-8323

**Karen's Chinese Restaurant**

36 Witherspoon Street- 609-683-1968

**Lahiere's** (*Contemporary & European Cuisine*)

11 Witherspoon Street - 609-921-2798

**Mediterra Restaurant** (*Mediterranean*)

29 Hulfish Street - 609-252-9680

**Sakura Express** (*Sushi & Teriyaki*)

43 Witherspoon Street - 609-430-1180

**Tortuga's Mexican Village** (*Mexican*)

44 Leigh Avenue - 609- 924-5143

## Important Contacts

Chair, Robert Vanderbei, Ext. 0876

Director of Graduate Studies, Warren Powell Ext. 5373

Department Manager, Connie Brown, Ext. 5422

Graduate Administrator, Noelina Hall, Ext. 4018

McCosh Health Center Emergency, Ext. 3139

Public Safety Emergency 9-1-1

