Operations Management PhD Program Guidelines

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0 Introduction

The Operations Management (OM) PhD program is offered by the Operations group which is part of the Managerial Economics and Decisions Sciences (MEDS) department of the Kellogg School of Management, Northwestern University. This document is designed to communicate as clearly as possible the guidelines and procedures that govern the Operations Management PhD program.

If there are any questions regarding this document, or aspects of the program not discussed in this document, please see the PhD coordinator.

These guidelines are organized by year in the program. In addition, there is a brief section at the end discussing the dismissal from the program.

1 Requirements and Guidelines for First-Year Students

1.1 Coursework

First-year PhD students are required to take twelve courses in the first year. This corresponds to a load of four courses each term (Fall, Winter, Spring). Students may audit other courses with the permission of the instructor, but typically are not permitted to enroll in more than for courses in one term.

The courses listed below are the standard courses in the first-year curriculum. First-year PhD students are required to take these courses. When appropriate, a student may petition the PhD coordinator to be granted a waiver for one or more of these course requirements because the student has already mastered the relevant content. Evidence of this mastery – good performance on a relevant prelim or similar examination, for example – is necessary for a waiver to be considered.

1) Fall

    a) MECS 460-1 Foun. of Managerial Economics I: Static Decision Models
    b) MKTG 476 Introduction to Applied Econometrics I
    c) MATH 321-1 Real Analysis
    d) ECON 410-1 Microeconomics

2) Winter

    a) OPNS 521 Foundations of Operations Management
    b) IEMS 460-1 Stochastic Models I
    c) MECS 477 Introduction to Applied Econometrics II
    d) ECON 410-2 Microeconomics

3) Spring

    a) OPNS 520 Contemporary Topics in Operations Management or OPNS 470 Operations Economics
    b) OPNS 483-1 Stochastic Foundations
    c) MECS 485 Empirical Issues in Business Strategy
    d) ECON 410-3 Microeconomics

The real analysis course may be substituted by a more advanced course if the student is already familiar with this course.

1.2 Prelim Exams

At the end of the first year (generally mid-June through early July, one exam per week), students take written exams in three fields:

1) Operations Management
2) Empirical Methods in Strategy
3) Microeconomics

Operations Management exam will cover the OPNS courses taught and the related material including MECS 460-1 and IEMS 460-1. The Microeconomics exams are given by the Economics department and are the same exams that are taken by students in the Economics PhD program. Students must pass all three exams in order to continue the program. If, at the end of first year, a student fails one or more prelim exams, s/he must retake them before the start of the second year (the retake is usually scheduled for late August or early September). Students who do not pass all of their exams on the second attempt will be dismissed from the program and will not be eligible to register for the second (or any subsequent) years of study.

1.3 Operations Seminars

The students are required to attend the weekly Operations seminars. If there is a potential conflict with their class schedule, they should see the program coordinator. They are also encouraged to attend the related seminars in Kellogg, IEMS, occasional joint Kellogg OPNS/McCormick IEMS seminars, and elsewhere in Northwestern.

1.4 Research and Teaching Assistantships

First-year students are not expected to fulfill a research or teaching assistantship requirement, but students who feel comfortable with their first-year coursework are welcome to seek them out.

1.5 Summer Research Activity

Students who pass their exams at the end of the first year are expected to spend the summer working with, or under the supervision of, one or more faculty members to pursue research and/or directed reading. If students cannot find a faculty member to work with on their own, they should see the PhD coordinator early in the Spring quarter.

Students receiving summer funding are expected to be on campus during the summer. Written permission of the Ph.D. coordinator is required for any absence longer than four weeks.

1.6 Activity Report

All PhD students are required to submit an annual activity report. An electronic copy of this report will be distributed in the Spring term. It must be filled out and submitted to the PhD coordinators promptly as part of qualifying for second-year funding. This report is due by the end of the Spring quarter.

In addition, Ph.D. students may be required to submit a summer activity report at the end of the summer.

1.7 Progress Guidelines

First-year students' progress is measured by their course grades and their performance on the prelim exams. Students must maintain at least a B average and satisfy the prelim exam requirements discussed in Section 1.2 to be in good academic standing. Students who are not in good academic standing should meet regularly with the PhD coordinator to ensure that they return to good standing as soon as possible. A student who is not in good academic standing at the end of the first year should expect to lose financial support and should expect to be asked to leave the program. Even though some research activity is expected in the summer after the first year, there is no direct evaluation of a student's research output in the first year.

During their first year, the PhD coordinator will meet students if at anytime their progress is not satisfactory.

At the start of the second year, first-year students will receive, in writing, a report on their first-year progress.

1.8 Requirements for a Master's Degree

While the goal of our doctoral program is the awarding of a PhD degree, in certain circumstances a master of science (MS) degree may be awarded to qualified doctoral students.

Students who are continuing for a PhD degree may be considered for a MS degree if they are in good standing, they have completed a minimum of three quarters of coursework, they have no incomplete grades, they have maintained an overall "B" average, and they will not receive residency (transfer) credit toward their PhD coursework requirements from a previously earned graduate degree. Students who are awarded residency credit are made ineligible for a MS degree from Northwestern as stipulated in regulations of the Graduate School.

Students who are leaving the doctoral program without completing the PhD will be considered for the MS degree if they have completed a minimum of three quarters of coursework, they have no incomplete grades, and they have maintained an overall "B" average.

Finally, note that the minimum grade requirement is subject to change in the future.

2 Requirements and Guidelines for Second-year Students

2.1 Coursework

In their second year, students must again take 12 courses. These courses may include one or more independent study courses. The students must take all Operations Management doctoral courses offered that year (with numbers OPNS xyz) unless they already took that course in their first year. These courses will typically include advanced courses such as OPNS 463 Stochastic Calculus & Control, and seminar courses such as OPNS-481 Revenue Optimization. In addition, the students are required to take six depth/breadth elective courses. These may be chosen from the following list (subject to PhD coordinators approval):

Kellogg PhD courses in other fields including but not limited to

MECS 460-2 Foundations of Managerial Economics II: Dynamic Decision Models
MECS 460-3 Foundations of Managerial Economics III: Game Theory
MECS 465 Contract Theory and Mechanism Design,
MECS 468 Topics in Economic Theory,
MECS 499-1 Competitive Strategy,
MECS 449-2 Strategy and Organizational Structure,
FINC 486 Corporate Finance
FINC 487 Dynamic Asset Pricing Theory
FINC 488 Econometrics of Financial Markets
FINC 489 Empirical Corporate Finance
ACCT 520-3 Seminar in Information Economics and Analytical Accounting Research

ACCT 520-4 Seminar on Agency Theory and Information Economics
MKTG 520-7 Seminar in Marketing

Economics PhD courses such as

ECON 450- 1,2,3 Industrial Organization,
Econ 414-1,2,3 Economics of Information,
ECON 412-1,2,3 Economic Theory and Methods
ECON 480- 1,2,3 Introduction to Econometrics

PhD Courses in IEMS, EECS, Mathematics, Statistics including but not limited to

IEMS 464 Advanced Queueing Theory
IEMS 465 Simulation Experiment Design and Analysis
IEMS 484 Inventory and Distribution Systems
IEMS 490 Special Topics: Dynamic Programming
IEMS 490 Health Policy Modeling
EECS 479/IEMS 450 Nonlinear Optimization
EECS 510 Probabilistic Techniques in Communication and Computation

PhD Courses in Mathematics, Statistics including but not limited to

MATH 410- 1,2,3 Analysis
MATH 450 -1,2,3 Probability
MATH 455 -1,2,3 Stochastic Analysis
STAT 454 – Time Series Analysis

2.2 Seminars

All PhD students are required to attend the weekly operations seminars. They are encouraged to attend seminars (relating to OM) elsewhere on campus.

2.3 Research & Teaching Assistantships

Throughout the second year, students should be involved in research and teaching assistantships at a recommended average level of 10 hours per week. It is fine to work more hours some quarters and less during others, as positions related to teaching and grading will often demand this. Students who cannot find positions on their own should contact the PhD coordinator.

This work requirement is formally a condition of the fellowship support. The work requirements for students who do not receive fellowship support from Northwestern will be specified in writing by the PhD coordinators at the time of admission, or when the funding is acquired if it is after the admission decision.

2.4 Second Year Research Paper and Presentation

During their second year students are required to write a research paper. By the end of the fall quarter of their second year, they must submit a one to two page paper proposal approved by a faculty member to the Ph.D. coordinator. The student must continue working on the research paper with (or under the supervision of) a faculty member. They are required to present their work and must receive (written approval of) at least two Operations faculty members before they start their 3rd year. The students should plan on making the presentation by the Labor Day weekend. They are also required to submit a draft of the paper. Upon completing the paper requirement, the student is admitted to Candidacy.

2.5 Summer Research Activity

Students are expected to be involved in research in their second summer. If students are not working on their own, under the guidance of a faculty member, and are having trouble connecting with a faculty member on their own, they should see one of the PhD coordinators early in the Spring quarter.

Students receiving summer funding are expected to be on campus during the summer. Written permission of a PhD coordinator is required for any absence longer than four weeks.

2.6 Activity Report

All PhD students are required to submit an annual activity report. An electronic copy of this report will be distributed in the Spring term. It must be filled out and submitted to the PhD coordinators promptly as part of qualifying for third-year funding.

In addition, PhD students may be required to submit a summer activity report at the end of the summer.

2.7 Progress Guidelines

Second-year students' progress is measured by their course grades, their research (specifically, their second-year papers), and their integration into the research and teaching environment through seminar attendance and RA/TA work. Students must maintain at least a B average, complete the second-year paper before the start of the 3rd year, and fulfill their field course and seminar attendance requirements to be in good standing. Students who are not in good standing at any point must meet regularly with the PhD coordinator to ensure that they return to good standing as soon as possible. A student who is not in good academic standing at the end of the second year should expect to lose financial support and should expect to be asked to leave the program.

At the start of the third year, students will receive, in writing, a report on their second-year progress.

2.8 Core MBA Operations Class

Students are required to take OPNS 430 in their second or third year. This course is offered in every quarter including summer quarter. This is intended to teach the students the basics of OM from a managerial perspective. Also, students are strongly encouraged to get familiar with at least one MBA OPNS elective to increase their exposure to MBA curriculum and teaching. TAing a course is a good way to do this. Such opportunities are available on a regular basis. Please see the program coordinator (or other faculty in OPNS group) if you are looking for such opportunities.

3 Requirements and Guidelines for Students in the third-year and above

3.1 Dissertation Proposal

Students in their third year must choose a dissertation advisor, form a Dissertation Proposal Committee and formulate and defend a dissertation proposal. Students should notify a PhD coordinator in writing when they form their Dissertation Proposal Committee. The committee must have a minimum of four members, at least two of whom must be members of the Operations Group, and at least one of whom must be from outside of the Operations Group. The (co)chair of the committee must be from the Operations Group, and the Kellogg Senior Associate Dean for Faculty & Research must approve the committee. Students must defend their dissertation proposal no later than September 15 prior to the beginning of the fourth year in the program.

At the start of the third year, students will meet with the PhD coordinators to discuss choosing advisors, and the proposal process.

3.2 Research and Teaching Assistantships

Third-year students must satisfy the same research and teaching assistantship requirements as second-year students (see 3.3 above).

3.3 Third-year Student Research Seminar

Third year students are strongly encouraged to give a research seminar in the weekly Operations Seminar Series.

3.4 Seminars

All PhD students are expected to continue to regularly attend operations seminars as described in Section 2.3.

Students who go on the academic job market must present their research in a Operations research seminar at least once before completing the program. It is recommended that this presentation take place before the academic job market. For most students, this means by the end of October in the year they are on the market.

3.5 Activity Report

All PhD students are required to submit an annual activity report. An electronic copy of this report will be distributed in the Spring term. It must be filled out and submitted to the PhD coordinators promptly as part of qualifying for continued funding.

In addition, PhD students may be required to submit a summer activity report at the end of the summer.

3.6 Summer Research Activity

Students are expected to be involved in research over the summer. Students should be working on their own, under the guidance of one or more faculty advisors. Students receiving summer funding are expected to be on campus during the summer. Written permission of the PhD coordinator is required for any absence longer than four weeks.

3.7 Dissertation and the Job Market

Students should plan to finish the program in four or five years. Students should discuss their progress towards completion regularly with their dissertation advisor(s).

The Dissertation must be defended in front of the Dissertation Committee and accepted by The Graduate School. The rules for the Dissertation Committee composition and approval are the same as for the Dissertation Proposal Committee, and once again, the Kellogg Senior Associate Dean for Faculty & Research must approve the committee. These two committees need not have the same members (though they typically do).

Students should also be aware that the academic job market takes place in the Fall and Winter for jobs starting the following academic year. This means that it is necessary to have at least one strong piece of original research ready to use as a job market paper by, at the latest, October of their final year in the program.

It is also essential for any student who is even remotely considering being on the job market to discuss this with their advisor and notify a PhD coordinator by the beginning of the summer before.

3.8 Progress Guidelines

Third-year students' progress is measured by their research progress (judged by their advisors), their integration into the research and teaching environment through seminar attendance and RA/TA work, and, most importantly their dissertation proposal defense. Students must successfully propose before the start of the fourth year and must have performed satisfactorily in the other aspects to be in good standing. Students who are not in good standing should meet regularly with the PhD coordinators to ensure that they return to good standing as soon as possible. A student who is not in good academic standing at the end of the third year or at any time during the fourth and later years may lose financial support and may be asked to leave the program.

In the fourth and later years, good academic standing requires ongoing, substantial progress towards completion of the dissertation. The chair of the dissertation or dissertation proposal committee must certify, on the annual Activity Report, that substantial progress is being made.

3.9 Funding

For students in good academic standing funding is provided for up to five years. For students in their sixth year and beyond, no systematic funding program beyond health insurance should be expected.

3.10 Degree Completion

The Graduate School has set a maximum time limit of eight years for successful completion of the dissertation. For more details, see the Graduate School bulletin.

4 Research Support

The Operations Group and the MEDS Department are committed to providing basic research support to PhD students. This includes providing a limited supply of computers, software, office space, basic office supplies, and photocopying. Students who have more substantial needs, such as funds to purchase data or run experiments, should plan to seek out support from other sources, both inside and outside the university.

Sources of funds within the university include research centers such as the Center for Operations and Supply Chain Management, GM Strategy Center, the Center for Strategic Decision-Making, and many others. Students who need support should

speak to their advisors for suggestions. In some cases advisors have research funds to support students directly. But in many cases, they do not.

Resources are also available on a limited basis for costs associated with presenting at academic conferences. Such requests should be made in writing to both PhD coordinators and the students well in advance of any such conferences. Normally the student will then be encouraged to apply to the Graduate School for partial funding that is matched by our program. See the Graduate School travel grant website at
http://www.tgs.northwestern.edu/financialaid/fellowshipsandscholarships/fellowshipsandgrants/conferencetravelgrant/
for details.

5 Dismissal

While every effort is made to admit only students who can satisfactorily complete our program, some students are occasionally asked to leave the program. Failure to pass the preliminary exams and failure to satisfactorily propose are the most common reasons for dismissal. In the event the PhD coordinators determine that a student has failed their prelim exam or otherwise failed to meet their academic standing requirements, or in the event the proposal committee decides that a student has not met the proposal requirements, a committee consisting of the PhD coordinators, the faculty who teach in the PhD program, and the proposal committee (if relevant) will evaluate whether the student should be asked to leave the program. All recommendations to dismiss a student will also be reviewed by the Kellogg Associate Dean of Faculty. This committee will also evaluate whether students who are asked to leave the program have met the requirements for a master's degree described in 2.8. The Graduate School may set additional requirements for the Master's degree.

If, at any time, a student feels the need to better understand the rules that apply to them or has any questions related to this document, they should talk to the PhD coordinator.