

Operations Doctoral Curriculum

The following document formalizes the course curriculum for the doctoral program in Operations. The purpose of a formalized curriculum is twofold. First, the curriculum is designed to prescribe a course of study so that a student will develop the ability to conduct scholarly research in the fields of operations and supply chain management. Second, the curriculum specifies the faculty expectations regarding the knowledge and skills that students must demonstrate in the doctoral qualifier and comprehensive examinations which are typically taken at the end of the first and second year of the doctoral program, respectively.

The Kenan-Flagler Business School requires a minimum of 15 semester courses (45 hours) for the doctorate degree. The 45-hour requirement should be regarded as a minimum. Most students will take more than 45 hours to gain sufficient depth in an area of research interest. Likewise, the faculty may require an individual student to take more than 45 hours as a result of perceived deficiencies or performance on the doctoral comprehensive examination.

The curriculum will be composed of (1) breadth requirements – courses that all Operations students must take; (2) a depth requirement where a student must take additional courses to gain sufficient depth in a selected area of research interest; and (3) electives designed to complete the curriculum. Breadth courses will likely be completed by the end of the second year in the PhD program. It will not be unusual for students to take remaining depth courses and electives during the third year of study. For both breadth and depth courses, students should aspire to and are expected to receive grades of H or P. Any grade of L or F in a breadth or depth course will be immediately brought to the attention of the Operations faculty for their advice about remedial action. The student will be required to either retake the course or successfully complete an approved substitute.

Breadth Courses

The breadth courses consist of the three categories: Prerequisite skill courses, Operations seminar courses, and Operations foundation courses. The breadth courses will serve as the basis of the doctoral qualifier and comprehensive examinations.

Prerequisite skill classes: Depending on the academic background of a student, he/she may need basic prerequisite courses in economics, deterministic modeling, or mathematical statistics. The following courses have been identified as prerequisite courses.

ECON 700: (QM “Bootcamp”) is recommended for students who have been out of an academic environment for several years, international students who will be in the U.S. for the first time or students whose analytical skills are “rusty.” While this is a 3 credit hour course offered in August, the course covers quantitative skills at an undergraduate level. Consequently, the 3 credit hours **DO NOT** count toward the 45 hours of doctoral course credit.

STOR 612 (Models in Operations Research) and **STOR 555** (Mathematical Statistics) are necessary prerequisite courses for students to take higher-level courses in operations research and statistics. Students who have already taken the equivalents of STOR 612 and 555 in a recent previous degree program may not need to retake these courses. This will be determined on a

case-by-case basis between the student and the PhD Program Coordinator. Credit from these courses will count toward the 45-hour course requirement.

Operations Seminar Courses: The following doctoral seminar core courses are required of all Operations doctoral students. The actual course offerings may vary each year. While students who haven't passed their comprehensive exams are required to take all PhD seminars offered by the area, all students are strongly encouraged to take Operations Seminar courses offered in each semester. The faculty reserves the right to modify these requirements to reflect current offerings by the area.

Busi 830: Theory of Operations Management I

Busi 831: Theory of Operations Management II

Busi 837: Advanced Topics in Operations Management *

Busi 838: Special Topics in Operations Management *

Busi 899: Seminar *

* These courses may be taken multiple times.

Operations Foundation Courses: The following graduate courses are required so that students develop appropriate skills to conduct rigorous research in Operations Management. These courses cover deterministic modeling, stochastic modeling, statistical analysis (including the general linear model) and economic analysis/game theory. Students who present an equivalent course at the graduate level to any one of these courses will take a higher-level substitute that will be determined by the student and PhD Program coordinator on a case-by-case basis.

STOR 614 Linear Programming or an equivalent substitute

STOR 641 Stochastic Processes I

STOR 642 Stochastic Processes II

STOR 664 Applied Statistics I

ECON 710 Advanced Microeconomics I or an equivalent substitute

ECON 711 Advanced Microeconomics II

The faculty will require that students have taken the breadth courses (or approved substitutes) by the end of the second year before taking the PhD comprehensive examination. These courses collectively constitute the basic foundation of knowledge needed to conduct scholarly research in Operations Management. The faculty will expect students to have mastered this material at the time of the comprehensive examination, and accordingly, the comprehensive examination questions will be based on this set of material. Even if a student takes a higher-level course or an approved substitute in place of one of the listed courses, he/she will be expected to maintain a current working knowledge of the material covered in that listed course. He/she will be responsible for the material in the listed course in the comprehensive examination.

Depth Courses

Each student must choose at least one research depth track and take at least two advanced courses beyond the breadth courses in that track. These courses can be chosen from doctoral seminars at other areas in the Kenan-Flagler Business School, doctoral-level courses at other

departments, and sister institutions. The courses chosen in the depth track must be approved by the PhD Program Coordinator in consultation with Operations faculty.

Track 1: Design of Operations Systems and Supply Chain Networks; Inventory Management

This track will require the student to take advanced courses in optimization.

Track 2: Stochastic Analysis of Operations Systems and Supply Chain Networks; Dynamic Pricing and Revenue Management

This track will require the student to take advanced courses in stochastic optimization.

Track 3: Empirical Research in Operations and Supply Chain Management

This track will require the student to take advanced courses in econometrics, applied statistics, and/or empirical analysis in order to analyze primary or secondary data related to operations and supply chain management. In addition, this track includes research on behavioral issues in operations/supply chain management.

Track 4: Competition and Coordination in Supply Chain Management

This track will require the student to take advanced courses in economic analysis, including game theory.

Elective Courses

Students may take elective courses to satisfy the 45-hour credit requirement (usually 1-3 courses are needed). These courses are chosen aiming to help develop competence in both content and methodology in preparation for doctoral research. Elective courses may consist of additional courses in the selected depth track, courses from another depth track, courses from other areas in the Kenan-Flagler Business School and/or approved courses from other departments in the university or at a sister institution. Courses must be taken at the graduate level and require pre-approval from the PhD Program Coordinator.

Qualifier Exam and Second Year Paper Requirement

In addition to the course program specified in this document, another requirement for the Operations PhD degree in business administration is the successful completion of a “qualifier exam” and a research paper (commonly called the “summer paper” or “second year paper”). A qualifier exam will be offered at the end of the first year of the program. Topics to be tested in the qualifier exam will be based on the student’s first year coursework and will be announced by the faculty PhD coordinator at the beginning of the year. First-year students must take the qualifier exam to be eligible for 2nd year funding. First year students who pass this exam will “place out” of taking this exam again. Second year students, who did not pass the qualifier in their first year, will take the exam again and successful passing of this exam is required to take the PhD comprehensive exam.

The students are expected to complete a research paper by the summer of their second year. The Graduate School handbook of the University of North Carolina at Chapel Hill states that “ Each academic program determines at what point a student must fulfill language or research skill requirements, provided that all such requirements are satisfied before a student is admitted to candidacy.” Successful completion of this research paper satisfies the research skill requirement and it is also a prerequisite to taking the PhD comprehensive exam. In some cases, this paper becomes the basis of the first essay of a student’s dissertation and/or is submitted for publication, but that is not a requirement.

In fulfilling the second year paper requirement, it is the faculty’s expectation that students work on their research paper full-time in the summer following their first year and part-time throughout their second year while taking classes. It is the student’s responsibility to seek out a faculty advisor and to select a paper topic. The expected milestones for the paper are as follows:

- In mid-May of the first year, students will submit a brief (approximately 4-pages) document identifying both the advisor and topic as well as presenting a preliminary research model and literature review. Students will give a short presentation (15-20 minutes) to the faculty on their progress up to this point. Students should submit their documents to the PhD coordinator at least one week before their presentation.
- In late-August of the first year, students will present their progress to the faculty (15-20 minute presentation). All other students will also submit a report on their summer research progress to the PhD program coordinator in late August.
- In mid-May of the second year, students will give a presentation of approximately 30 minutes to the faculty. The students should share a draft of their second year paper with the faculty at least one week before their presentations.
- The final version of the research paper, with signed approval of two faculty members, is due by June 15 in the summer following the second year. The paper should include a full literature review, a detailed model, research results, and a statement of managerial insights.
- If a student fails to meet these deadlines or to turn in an acceptable second year paper in the opinion of the faculty, the faculty may disqualify the student from taking the comprehensive exam and/or revoke the student’s funding on the basis of failure to make satisfactory progress in the doctoral program.

PhD Comprehensive Exam

An open-ended research based PhD “comprehensive” written exam will be administered at the end of the second year. Students must first pass the qualifier exam and satisfy the second year paper requirement to be eligible to take the PhD comprehensive exam.

Dissertation proposals:

Students will be required to submit and defend their dissertation proposal at least one semester before their PhD dissertation defense. The dissertation proposal and the PhD defense should happen while the student is enrolled in the PhD program.

OM Scholar Award

Students making accelerated progress towards their PhD and who have established exceptional research records will be considered for the OM scholar Award in August every year. The OM PhD coordinator will set milestones that students need to achieve for consideration of the OM Scholar award. The “OM Scholar” designation will be accompanied with a monetary award, the amount and number of these awards will be determined by the OM Area Chair.

Implementation

The revised doctoral curriculum will apply to all students with less than 30 hours of course credit as of August 1, 2015. Each semester the Operations faculty will review the progress of each student in meeting his/her curricular requirements. At any time, but particularly when the doctoral comprehensive examination is given, the Operations faculty may require an individual student to take or re-take specific courses that may or may not be listed in this curriculum. The advice of the faculty is binding and pre-empts any student discretion in course selection that may be implied within the curriculum.

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