SPECIAL REPORT

OF THE

GRADUATE and

PROGRAM AND BUDGET COUNCILS

concerning

REVISION OF THE MANAGEMENT SCIENCE CONCENTRATION
IN THE MANAGEMENT Ph.D.
(#8657)

Presented at the
817th Regular Meeting of the Faculty Senate
November 17, 2022

COUNCIL MEMBERSHIP

GRADUATE COUNCIL

Evelyn Ashley, Joseph Black, Ana Caicedo, Robert DeConto, Jennifer Friedman, Traci Hess, Alexandra Jesse, Neal Katz, Bernhard Leidner, Robert Maloy, Anthony Paik, Sarah Pfatteicher, Sarah Poissant, Darrel Ramsey-Musolf, Rebecca Reznik-Zellen, Memnun Seven, Patrick Sullivan, Corine Tachtiris, Jacqueline Urla, Tilman Wolf

GRADUATE COUNCIL RECOMMENDATION
The Graduate Council recommends approval of this proposal.

PROGRAM AND BUDGET COUNCIL

Zlatan Aksamija, Jeremiah Bentley, Kathleen Berry, William Brown, Elizabeth Chang, Rosemary Cowell, Sarah Goff, Deborah Gould, Moira Inghilleri, Yoon Ju Kang, Andrew Mangels, Lynn McKenna, Anthony Paik, Alexander Phillips, Anurag Sharma, Gregory Spiridopoulos, Gabriela Weaver, Lisa Wegiel

PROGRAM AND BUDGET COUNCIL RECOMMENDATION
The Program and Budget Council recommends approval of this proposal.
I. Concentration

1. Title: Rename "Management Science" to "Operations Management"
2. Proposed Starting Date: 8/3/2022

II. Proposal Development
   A. Briefly describe the Proposal

To rename the existing concentration of ‘Management Science’ under the PhD in Management of the Isenberg School as ‘Operations Management’.

The Operations and Information Management Department houses the existing ‘Management Science’ concentration. Currently ‘Management Science’ concentration takes in applicants in the Operations Management (OM) and Information Systems (IS) disciplines. Changing the name to Operations Management meshes more with the new department name, which was renamed 10 years ago, and aligns with both the scholarly research as well as the placement of our doctoral students.

   B. Provide a brief overview of the process for developing the proposal.

The OIM faculty discussed the renaming of the original Management Science PhD concentration, with its long history of over half a century. The MS/OM faculty had additional conversations over the past two years and have reached a consensus that the renaming would be synergistic with the department's new name, its direction, as well as the research conducted, and the placement of PhD students over the past decade.

In the past decade (and earlier), the placements of our PhD graduates in MS have been excellent, with, for example, placements and faculty holding positions now at: the University of Connecticut, WPI, University of Nebraska, University of Michigan Dearborn, Babson College (2), University of Alabama Birmingham, Old Dominion University, Pace University, University of San Francisco, University of Portland, Mississippi State University, Manhattan College, University of Idaho, York University, Vienna University of Economics and Business, the University of Sydney, UMass Lowell, and various Penn State campuses. Two of our graduates are also currently among the OIM departmental faculty. Several of our PhD students have also garnered postdocs at McGill University, Northwestern University, and Mass General Hospital / Harvard Med, before continuing on as faculty members.

Our program has an excellent reputation since the faculty work very closely with the PhD students, who achieve a record of scholarly publications even prior to graduation. The students are active presenters at major conferences, including INFORMS and POMS.

III. Purpose and Goals
   1. Describe the proposal's purpose and the particular knowledge and skills to be acquired.

As stated above, the PhD concentration in OM would essentially rename the original MS concentration. The research activities will continue at the highest level in such areas as supply chain management, transportation and logistics, humanitarian operations and disaster management, healthcare operations, nonprofit operations management, sustainable operations, and retail analytics, to name just a few of the very active research areas. The focus includes
mathematical modeling, optimization and game theory, algorithms, rich and impactful applications derived from the real-world.

IV. Resources

1. If this proposal requires no additional resources, say so and briefly explain why. If this proposal requires additional resources, explain how they will be paid for. For proposals involving instruction, indicate how many new enrollments are expected and whether the courses have room to accommodate them.

The proposal requires no additional resources, except that one OM faculty member is leaving at the end of this academic year and a replacement hire will be needed. Ultimately, given that the MS/OM faculty are heavily engaged in research, more hires are expected. Our former OIM department chair, who was an economist also retired last year, creating an opportunity for a replacement in a relevant OM area.

Curriculum

Provide a curriculum outline showing degree program requirements, requirements of any existing concentrations, requirements of proposed concentration, and how they relate. You may include this outline and any additional documents as attachments below.

A curriculum outline and program of study have been attached (see response to the next question). This information is currently included in the Isenberg PhD in Management handbook along with the materials for the 8 other concentrations that currently exist in the Isenberg PhD in Management (i.e., Accounting, Finance, Hospitality & Tourism Management, Marketing, Organizational Studies, Sports Management, Strategic Management, Management Science).

ATTACHMENTS:

1. Operations Management Timeline
2. Operations Management PhD concentration overview

MOTION: That the Faculty Senate approve the Revision of the Management Science 10-23 Concentration in the Management Ph.D., as presented in Sen. Doc. No. 23-022.
Operations Management

Area Coordinator
Professor Anna Nagurney
nagurney@isenberg.umass.edu
413-545-5635

Program Overview
Isenberg's Ph.D. in Operations Management is a full-time, residential program designed to train students in Operations Management. Research in Operations Management is diverse and offers an exciting opportunity to discover and enhance business processes using data analytics, statistics methods, mathematical modeling, and optimization methodology.

Ph.D. Faculty
Agha Iqbal Ali  Robert Nakosteen  Senay Solak (Chair)
Ahmed Ghoniem  Alan Robinson  Priyank Arora

Management Science Track

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<tr>
<th>First Year</th>
<th>Fall Semester 1</th>
<th>Spring Semester 1</th>
<th>Summer 1</th>
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<td>Required program seminars:</td>
<td>1st summer paper</td>
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<td>Socialization seminar, 4 meetings first third of semester (no credit)</td>
<td>SCH-MGMT 805 Research Methods II (3 credits)</td>
<td>Research assignments</td>
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<td>SCH-MGMT 897TA Teaching Seminar (1 credit)</td>
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<td>SCH-MGMT 804 Research Methods I (3 credits)</td>
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<td>Research assignments</td>
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<td>Research assignments</td>
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<td>Required program credits (18 to graduate):</td>
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<td>Complete remaining concentration coursework</td>
<td>SCH-MGMT 899 Dissertation Credits (1-9 per semester)</td>
<td>Achieve candidacy</td>
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<td>Pass comprehensive exam</td>
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<td>Teach course(s) as primary instructor</td>
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<td>Dissertation defense</td>
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Required Courses:

SCH-MGMT 825X: Integer Programming
SCH-MGMT 825: Seminar in Management Science

Possible Electives Subjects:
Mechanical & Industrial Engineering, Resource Economics, Economics, Education, Computer Science, Civil & Environmental Engineering
Operations Management Intro (approx. 50 words)

Research in Operations Management is diverse and offers an exciting opportunity to discover and enhance business processes using data analytics, statistics methods, mathematical modeling and optimization methodology. Doctoral students in this concentration specialize in Operations Management (OM). All Ph.D. students must fulfill coursework requirements and complete a dissertation that advances knowledge in their field of concentration and is sound in theory, computation, and application.

Message from Coordinator (approx. 150 words)

At Isenberg’s PhD program Operations Management, doctoral students receive an exceptional training under the tutelage of renowned faculty members. Their research is conducted at the highest levels of academic rigor and scholarly excellence and target prestigious journals of the field.

We support and prepare our students for exciting academic and research positions by offering:

- An assistantship for five years, including the first four summers;
- An excellent research training that yields several research manuscripts targeting some of our best journal outlets;
- An opportunity to present research work at major conferences in our field, including INFORMS, POM, and ICIS;
- An immersion into academia by nominating students for doctoral colloquia at major conferences;
- An opportunity to strengthen their CVs by teaching introductory courses for three semesters;
- An opportunity to compete for school and campus awards, including the prestigious Isenberg Outstanding Doctoral Student Researcher Award and the Isenberg Outstanding Doctoral Student Teacher Award. Our students have regularly garnered such awards.

The totality of the training and mentoring our students receive at Isenberg uniquely prepares them for outstanding careers.

About the Program

Overview (approx. 60 words)

Isenberg’s PhD in Operations Management is a full-time, residential program designed to train students in Operations Management. It comprises a solid coursework, a three-semester teaching requirement, and several examinations for the completion of the degree.

Areas of Study

Management Science PhD students can study any area of interest and take courses in:

- Operations Management/Research
- Data analytics and statistics

Research
Isenberg faculty conduct research at the forefront of their disciplines and are involved in projects that are nationally and internationally funded.

In OM, students conduct novel research in such areas as supply chain management, manufacturing and service operations management, transportation and logistics, retail analytics, airline management, portfolio management, sustainable operations, humanitarian logistics and healthcare, quality management, or disruption and business continuity management, to name a few. Such research is methodologically grounded in management science core competencies and employs optimization theory, mathematical modeling, statistics, and stochastic processes.

**Academic Overview**

Students are admitted for Fall semesters and receive an assistantship that is continued over five academic years (including their first four summers) subject to good academic standing and progress. Students complete forty-five credits of course work, in addition to a 3-credit teaching course. Admitted students are temporarily advised by the Ph.D. coordinator until their formally identify an advisor during their first or second semester. All students must have identified an advisor before their first summer.

There are four examinations that a student must successfully complete:

- **The Core Exam**, in the first summer, is designed to assess a student’s academic preparation for advanced work toward a Ph.D. degree. The specific core requirement is decided upon by a committee which consists of the student’s advisor and two other members of the graduate faculty and must include at least two faculty members from the Operations & Information Management Ph.D. concentration. The exam has traditionally consisted of a summer research paper.

- The **Comprehensive Exam**, administered after the completion of a minimum of 36 credits of graded coursework, is designed to assess a student’s academic preparation for conducting scholarly research. The specific comprehensive examination requirement is decided upon by a committee which consists of the student’s academic advisor and two other members of the graduate faculty and must include at least two faculty members from the OIM Ph.D. concentration. This requirement is satisfied by a comprehensive examination that may consist of a written (in-class or take-home) examination and an oral examination administered by the committee.

- The **Dissertation Proposal Defense** that serves as a milestone for the student’s dissertation and validates, with the committee approval, the student’s research progress and plan to complete the dissertation.

- The **Dissertation Defense** is the final examination that marks, if successful, the completion of the student’s doctoral studies at Isenberg.

**Coursework:**

Students complete forty-five credits of course work, in addition to a 3-credit teaching course. The courses taken during the PhD program should be selected to ensure that the student has acquired (i)
core knowledge and (ii) research methods, statistics, and theory courses. A student’s program of study must include:

- A minimum of six courses, i.e. 18 credit hours, by the end of the first year.
- A minimum of 12 courses, i.e. 36 credit hours, by the end of the second year.
- A minimum of one graduate course in organizational behavior, leadership, business principles, or a graduate Isenberg Seminar.

A student may undertake independent studies (up to three) under the direction of a graduate faculty member as well as graduate courses from other departments such as Statistics, Mechanical and Industrial Engineering, Computer Science, Psychology, Marketing, and Management subject to approval by the advisor or the PhD coordinator.

Core Knowledge includes:

- Business Process Optimization
- Supply Chain Management
- Graduate Course as approved by the advisor or PhD coordinator

Research Methods, Statistics, and Theory include:

- Linear Programming
- Stochastic Processes
- Nonlinear Network Optimization, Game Theory, and Variational Inequalities
- Integer Programming
- Stochastic Optimization
- Advanced Topics (can be taken for repeat credit)
- Psychology, Sociology, Marketing and Management Seminars
- Computer Science (Data Structures, Algorithms, etc.)
- Statistics (Psych)
- Multivariate Statistics (Educ)
- Hierarchical Linear Modeling (Psych)
- Economics
- Research Methods
- Experimental Design
- Structural Equation Modeling (Psych or Educ)
- Graduate Courses as approved by the advisor or PhD coordinator

Sample course work for Operations Management during the first year

<table>
<thead>
<tr>
<th>First Year – Fall</th>
<th>First Year – Spring</th>
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<tbody>
<tr>
<td>Methods and Statistics Course 1</td>
<td>Methods and Statistics Course 2</td>
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<tr>
<td>Business Process Optimization</td>
<td>Theoretical Foundations Course 1</td>
</tr>
<tr>
<td>Supply Chain Management</td>
<td>Theoretical Foundations Course 2</td>
</tr>
<tr>
<td>Linear Programming</td>
<td>Business Intelligence and Analytics</td>
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</tbody>
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Degree Timeline:

YEAR 1: Coursework and Core Exam.

YEAR 2: Coursework and Comprehensive exam.
YEAR 3: Development of dissertation proposal and Teaching.

YEAR 4-5: Dissertation research, teaching, and dissertation final defense.