DOCTOR OF PHILOSOPHY IN MANAGEMENT SCIENCE

Stuart's Ph.D. in Management Science offers comprehensive coverage on the application of quantitative methods, analytical tools, and computer models to decision-making problems in business, finance, and operations management.

Program Goals

This program prepares students and working professionals for careers in academia as well as executive and management positions in business, government, and consulting sectors. The Ph.D. program emphasizes both analysis and synthesis. The required courses provide the tools to analyze business problems and to develop new systems or new solutions. Once students master these skills, their dissertation work involves structuring a problem, gathering data where appropriate, and solving it. The research methodologies of management science can be applied to any aspect of business. The program's goal is to facilitate the contribution of new knowledge to the field of business through applied research that addresses important problems in operations and finance.

Admission Requirements

Applicants to the Ph.D. in Management Science must have a competitive score on the GMAT or GRE (316 or above for GRE and 650 or above for GMAT). Other requirements include an essay outlining the fit between the applicant's background, expertise, and career goals, and letters of recommendation. Journal publications or conference presentation activities of Ph.D. applicants that attest to their research experience and future research potential are preferred, although not essential.

The following description outlines additional requirements for each track within the Ph.D. in Management Science:

1. M-track (for students who have completed requirements for the MS in Management Science from the Stuart School)
2. M-track with Analytics concentration: a graduate degree considered equivalent to the M.S. in Marketing Analytics degree offered at the Stuart School
3. M-track with Quantitative Finance concentration: a graduate degree considered equivalent to the M.S. in Finance degree offered at the Stuart School

Curriculum

Applicants to the Ph.D. program must have completed a master's degree with a graduate level business core, or a master's in finance or equivalent degree. For applicants who have a master's degree but have not completed the business core, some prerequisite courses will be required.

This program is selective and small with a high degree of interaction between faculty and students, and a mentor relationship with a faculty adviser. The Ph.D. committee carefully matches the interest of the student with the expertise of the faculty member. The program offers two concentrations: analytics and quantitative finance.

Analytics Concentration

The Ph.D. program with a concentration in Analytics is well positioned in terms of opportunities for graduates in the career marketplace. Graduates can pursue career options ranging from traditional academia (teaching in schools offering programs focused on analytics) to positions in consulting, industry, and government that require expertise in business analytics, predictive modeling, and management of big data. The program offers opportunities to develop specialized skills involving analytics in fields such as marketing, networks, and supply chain management.

Quantitative Finance Concentration

Graduates of the Ph.D. program with a concentration in Quantitative Finance have a wide choice of careers. In addition to a traditional academic career focused on teaching and research, graduates may also work in investment and commercial banking, trading, and risk management. Dissertation research in this area may include a wide range of topics such as risk modeling, financial time series analysis, and investment analysis.

DOCTOR OF PHILOSOPHY IN MANAGEMENT SCIENCE - M-TRACK (FOR STUDENTS WHO HAVE COMPLETED REQUIREMENTS OF THE MS IN MANAGEMENT SCIENCE FROM THE STUART SCHOOL)

Students who have successfully completed the course work for the MS in Management Science may petition to continue their studies in the PhD in Management Science. Students who petition for transfer after their first year must have completed the PhD basic core and they must have passed the PhD qualifying exam. Students who petition for transfer after their second year have completed the PhD advanced core and passed the PhD qualifying exam in their second year. The final decision to allow transfer of credits will be made by the program director of the PhD program after a full review of the student's performance in the MS in Management Science. If accepted into the PhD program, the student will be able to transfer all PhD level credits into the program.

MS Management Science students who transfer to the PhD program will typically begin their doctoral studies in the third year. They will take sufficient course credits to increase their total course credits to 48 credit hours and will enroll in 24 credit hours of dissertation research.

Code	Title	Credit Hours
Basic Core Requirements		**(12)**
MSC 511	Math for Mgmt Science I	3
MSC 512	Statistics for Mgmt Science I	3
MSC 514	Math for Mgmt Science II	3
MSC 515	Statistics for Mgmt Science II	3
HUM 601	TA Seminar	0
Advanced Core Requirements		**(24)**
MSC 611	Philosophy of Management	3
MSC 612	Advanced Research Methods	3
Specialization courses (see Specializations tab for required courses)		18
Tech Core		**(12)**
(see TECH Core tab for list of courses)		12
Ph.D. Research		**(24)**
MSC 691	Research and Thesis PhD	24
Students who join the PhD-MSC program after completing the MS-MSC requirements will need to complete 15 additional Course Credit Hours (may include any remaining courses in TECH Core not completed in MS-MSC and two remaining PhD-MSC specialization courses not completed in MS-MSC), transfer MS-MSC credit hours to the PhD-MSC degree, and complete 24 hours of Research Credit. If all 33 MS-MSC credits are transferred, this would satisfy the 72 credit hours required for the PhD-MSC degree (i.e., 15+33+24=72)		
Total Credit Hours		**72**

Doctor of Philosophy in Management Science - M-Track (for students WHO HAVE NOT COMPLETED THE MS-MSC degree)

In the first year, full-time students will complete the Ph.D. basic core. The core consists of two course sequences in mathematical and statistical methods in management science. The qualifying exam must be taken after completing the six MSC courses in the first year as per PhD program structure. If a student does not pass the qualifying exam in their first year, they will have the opportunity to retake the exam in their second year.

In the second year, full-time students will complete the Ph.D. advanced core (a six-course sequence consisting of two Ph.D. advanced core courses and four specialization-specific courses as shown below). After completing all required Ph.D. coursework, usually at the end of the second year of full-time study, a written comprehensive examination is required. This examination is a rigorous review of the level of competency achieved as a result of the entire program of graduate study. The comprehensive exam may be taken only twice.

In the third and fourth year of graduate study, full-time students will take sufficient adviser-approved courses to meet the requirement that total course credit hours meet the 48 credit hour requirement. Part-time students may take additional time to complete these courses. An important requirement for this stage of the program is that students complete four courses from the TECH CORE list of required courses. TECH CORE emphasizes current areas of specialization in Management Science research and provides students with the skills necessary to undertaken advanced research in these areas.

Code	Title	Credit Hours
Basic Core Requirements		**(12)**
MSC 511	Math for Mgmt Science I	3
MSC 512	Statistics for Mgmt Science I	3
MSC 514	Math for Mgmt Science II	3
MSC 515	Statistics for Mgmt Science II	3
HUM 601	TA Seminar	0
Advanced Core Requirements		**(24)**
MSC 611	Philosophy of Management	3
MSC 612	Advanced Research Methods	3
Specialization courses (see Specializations tab for required courses)		18
Tech Core		**(12)**
(see TECH Core tab for list of courses)		12
Ph.D. Research		**(24)**

MSC 691	Research and Thesis PhD	24
In summary, the PhD-MSC requirement of 72 hours is met with 48 course credit hours and 24 Research Credit hours.		
Total Credit Hours		**72**

Program of Study

Stuart requires that at least the first two years of study be completed on a full-time basis. After completion of coursework and qualifying/comprehensive exam requirements, the dissertation research may be done off campus if suitable arrangements for supervision are made.

When a student is ready to begin dissertation research work, the Dean of the Stuart School will appoint a mutually acceptable research adviser to supervise the student's research. The student will work with the adviser to constitute a dissertation committee (composed of at least four full-time faculty members including the adviser, one of whom will be a representative from outside the student's field) before beginning work on a dissertation project that must be an original investigation of high quality. Students are required to defend a dissertation proposal before the dissertation committee. After the dissertation project is completed, the student will appear before the dissertation committee to defend the dissertation project. Usually, the dissertation proposal defense and the dissertation defense are at least six months apart.

Full-time students may take up to six years to complete the degree. After six years, students may petition for an extension, but they must reapply to the program and may be required to retake a comprehensive examination.

Students entering the program may transfer courses from a graduate program at another AACSB-accredited university if the student has not used the courses to satisfy the requirements for a degree at the university.

Some students may be required to take prerequisite courses in mathematics, statistics, or computer programming before being admitted to a graduate course. Undergraduate course offerings, which typically are listed with a primary numeral of four or below, cannot be used as free electives in the Ph.D. program.

Management Science Specializations

Analytics

Code	Title	Credit Hours
Required Courses		**(18)**
MAX 522/MSC 615	Predictive Analytics	3
MAX 523/MSC 616	Social Media Mktg Analytics	3
MSC 651	Quantitative Marketing Models	3
MSC 652	Supply Chain Analytics	3
MSC 653	Topics in Marketing Analytics	3
MSC 654	Social Network Analytics	3
Total Credit Hours		**18**

Quantitative Finance

Code	Title	Credit Hours
Required Courses		**(18)**
MSC 621	Corporate Finance	3
MSC 623	Investments	3
MSC 631	Theory of Finance I	3
MSC 633	Theory of Finance II	3
MSF 545/MSC 613	Struct Fixed Income Portfolios	3
MSF 546/MSC 614	Quant Investment Strategies	3
Total Credit Hours		**18**