Program Change Request

Date Submitted: 01/05/22 3:47 pm

Viewing: **SL-APSC-MS : M.S. in Applied <u>Statistics</u> ~~Mathematics~~**

Last edit: 01/05/22 3:47 pm

Changes proposed by: Sunil Dhar (dhar)

Catalog Pages Using this Program	M.S. in Applied Statistics

Department(s) / College(s)	Department	College
	Mathematics (MATH)	Coll of Science & Liberal Arts (SL)

Name of Program	M.S. in Applied <u>Statistics</u> ~~Mathematics~~
Academic Level(s)	Graduate
Degree Designation	MS
Campus(es) where the program will be offered	Newark
CIP Code	
Effective Catalog Edition	2022-2023
Faculty Senate Review required?	

Related Department(s)	Department(s)
	Mathematics (MATH)

In Workflow

1. **MATH Chair**
2. **AIS**
3. **SL Dean**
4. **Vice Provost of Graduate Studies**
5. President of the Faculty Senate
6. Provost's Office
7. Academic Issues Committee

Approval Path

1. 01/05/22 3:19 pm Zoi-Heleni Michalopoulou (michalop): Rollback to Initiator
2. 01/06/22 11:27 am Zoi-Heleni Michalopoulou (michalop): Approved for MATH Chair
3. 01/06/22 1:14 pm Mesfin Ayne (ayne): Approved for AIS
4. 01/06/22 1:28 pm John Wolf (jwolf):

If the change involves altering the department's curriculum paradigm as currently outlined in the NJIT catalog, please attach existing and proposed paradigms.

Articulation with other institutions, if any	List the institutions with which articulation agreements will be arranged:

Objectives

Briefly summarize the program and indicate its objectives; e.g., the nature and focus of the program, the knowledge and skills students will acquire, any cooperative arrangements with other institutions or external agencies in offering this program, etc.

Need

Provide justification of the need for this program. If the program falls within the liberal arts and sciences and does not specifically prepare students for a career, then provide evidence of student demand and indicate opportunities for students to pursue advanced study (if the degree is not terminal with regard to further education). If the program is career-oriented or professional in nature, then in addition to student demand give evidence of labor market need and results of prospective employer surveys. Report labor market need as appropriate on local, regional, and national bases. Specify job titles and entry-level positions for program graduates, and/or indicate opportunities for graduates to pursue additional studies.

Relationship to the University and State Master Plans

Describe the relationship of the program to the following: institutional master plans and priorities.

Relationship to Similar Programs in the State and Region

List similar programs within the state and in neighboring states. How does this program compare to those currently being offered?

Distinguished Programs Nationally

For doctoral programs: Supply a select list of distinguished programs nationally in this discipline.

Students

Estimate anticipated enrollments from the program's inception until a steady state or optimum enrollment is reached.

Resources to Support the Program

Briefly describe the additional resources needed to implement and operate the program during the program's first five years, e.g., the number of full-time faculty, number of adjunct faculty, computer equipment, print and non-print material, etc.

Course
Development Plan

Names of faculty
involved

Libraries and
Computing
Facilities

Classrooms and
Laboratories Needs

Catalog Description (For PHD programs, include information about the qualifying exams, and other program milestones.)

Curriculum

Degree Requirements

The Master of Science in Applied Statistics requires 30 credits: 21 credits in core courses and 9 credits of elective courses. Students must successfully complete at least 24 of these credits at the 600-level or higher, and no more than six credits at the 500-level will be counted towards the degree. A master's thesis or a master's project is optional.

Seminar: In addition to the minimum 30 degree credits required, all students who receive departmental or research-based awards must enroll every semester in MATH 791 Graduate Seminar.

M.S. in Applied Statistics (courses only)

Core Courses

MATH 644	Regression Analysis Methods	3
MATH 659	Survival Analysis	3
MATH 661	Applied Statistics [1]	3
MATH 662	Probability Distributions	3
MATH 664	Methods for Statistical Consulting	3
MATH 665	Statistical Inference	3
MATH 699	Design and Analysis of Experiments	3

Electives

Select three of the following courses, or any other three related courses with the approval of the graduate advisor.		9
MATH 604	Mathematical Finance	3
MATH 605	Stochastic Calculus	3
MATH 611	Numerical Methods for Computation	3
MATH 630	Linear Algebra and Applications	3
MATH 654	Clinical Trials Design and Analysis	3
MATH 660	Introduction to statistical Computing with SAS and R	3
MATH 691	Stochastic Processes with Applications	3
MATH 698	Sampling Theory	3
MATH 763	Generalized Linear Models	3
MATH 768	Probability Theory	3
Total Credits		60

1

MATH 661 Applied Statistics and MATH 663 Introduction to Biostatistics cannot both be used toward degree credits at NJIT. The requirements of MATH 661 Applied Statistics may, in individual cases, be substituted by MATH 663 Introduction to Biostatistics, at the discretion of the Graduate Advisor.

M.S. in Applied Statistics (M.S. project)

Core Courses

MATH 644	Regression Analysis Methods	3
MATH 659	Survival Analysis	3
MATH 661	Applied Statistics [1]	3

MATH 662	Probability Distributions	3
MATH 664	Methods for Statistical Consulting	3
MATH 665	Statistical Inference	3
MATH 699	Design and Analysis of Experiments	3
Master's Project		
MATH 700B	Master's Project	3
Electives		
Select two of the following courses, or any other two related courses with the approval of the graduate advisor.		6
MATH 604	Mathematical Finance	3
MATH 605	Stochastic Calculus	3
MATH 611	Numerical Methods for Computation	3
MATH 630	Linear Algebra and Applications	3
MATH 654	Clinical Trials Design and Analysis	3
MATH 660	Introduction to statistical Computing with SAS and R	3
MATH 691	Stochastic Processes with Applications	3
MATH 698	Sampling Theory	3
MATH 763	Generalized Linear Models	3
MATH 768	Probability Theory	3
Total Credits		60

1

MATH 661 Applied Statistics and MATH 663 Introduction to Biostatistics cannot both be used toward degree credits at NJIT. The requirements of MATH 661 Applied Statistics may, in individual cases, be substituted by MATH 663 Introduction to Biostatistics, at the discretion of the Graduate Advisor.

M.S. in Applied Statistics (M.S. thesis)

Core Courses		
MATH 644	Regression Analysis Methods	3
MATH 659	Survival Analysis	3
MATH 661	Applied Statistics [1]	3
MATH 662	Probability Distributions	3
MATH 664	Methods for Statistical Consulting	3
MATH 665	Statistical Inference	3
MATH 699	Design and Analysis of Experiments	3
Master's Thesis		

MATH 701B	Master's Thesis	6
& MATH 701B	and Master's Thesis	
or MATH 701C	Master's Thesis	
Electives		
Select one of the following course, or any other one related course with the approval of the graduate advisor.		3
MATH 604	Mathematical Finance	3
MATH 605	Stochastic Calculus	3
MATH 611	Numerical Methods for Computation	3
MATH 630	Linear Algebra and Applications	3
MATH 654	Clinical Trials Design and Analysis	3
MATH 660	Introduction to statistical Computing with SAS and R	3
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Electives are chosen in consultation with a departmental graduate advisor and consist of advanced courses in mathematics and statistics and advanced courses from engineering, computer science, and biology that have a significant statistics content. Students are encouraged to choose courses in application areas. Courses offered by appropriate departments at NJIT, RBHS, and Rutgers University-Newark can be used as electives within the limits of the NJIT transfer policy. All elective courses must be approved by the graduate advisor.

Is licensure required of program graduates to gain employment?

Will the institution seek accreditation for this program?

Add any additional information you would like brought to the attention of CUE/ CGE here

Attach any additional information you would like brought to the
attention of CUE/ CGE here: Uploaded Files:

Reviewer Comments	**Zoi-Heleni Michalopoulou (michalop) (01/05/22 3:19 pm):** Rollback: Make a change as discussed.

Date Submitted: 01/24/22 8:12 am

Viewing: **SM-BDS-PHD : PHD. in Business Data Science**

Last approved: 10/26/21 9:46 pm

Last edit: 01/24/22 8:12 am

Changes proposed by: Melodi D. Guilbault (guilbaul)

Catalog Pages Using this Program	[Ph.D in Business Data Science](#)

Department(s) / College(s)	Department	College
	Management (MGMT)	Martin Tuchman Sch of Mgmnt (SM)

Name of Program — PHD. in Business Data Science

Academic Level(s) — Doctoral

Degree Designation — PHD

Campus(es) where the program will be offered — Newark

CIP Code

Effective Catalog Edition — 2022-2023

Faculty Senate Review required?

Related Department(s)

If the change involves altering the department's curriculum paradigm as currently outlined in the NJIT catalog, please attach existing and proposed paradigms.

Articulation with other institutions, if any

Objectives

Briefly summarize the program and indicate its objectives; e.g., the nature and focus of the program, the knowledge and skills students will acquire, any cooperative arrangements with other institutions or external agencies in offering this program, etc.

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Provide justification of the need for this program. If the program falls within the liberal arts and sciences and does not specifically prepare students for a career, then provide evidence of student demand and indicate opportunities for students to pursue advanced study (if the degree is not terminal with regard to further education). If the program is career-oriented or professional in nature, then in addition to student demand give evidence of labor market need and results of prospective employer surveys. Report labor market need as appropriate on local, regional, and national bases. Specify job titles and entry-level positions for program graduates, and/or indicate opportunities for graduates to pursue additional studies.

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Describe the relationship of the program to the following: institutional master plans and priorities.

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Students

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Resources to Support the Program

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Course
Development Plan

Names of faculty
involved

Libraries and
Computing
Facilities

Classrooms and
Laboratories Needs

Catalog Description (For PHD programs, include information about the qualifying exams, and other program milestones.)

Curriculum

Ph.D. in Business Data Science

Degree Requirements

Ph.D. students in Business Data Science (BDS) are expected to conduct innovative and independent research and have their research findings published in peer-reviewed scholarly journals and academic conference proceedings.

By the beginning of the first semester, upon the approval of the Ph.D. program director, student must have filed a Plan of Study (POS) that lists the courses to be taken and the timeline of study. Any modification to the POS must be approved by the Ph.D. program director and dissertation advisor (if chosen).

Coursework

Bridge Courses

Students who lack fundamental knowledge of certain subjects are required to complete assigned bridge courses by the end of year one, with a grade of at least a B in each assigned course. The assignment of bridge courses is based on recommendation and approval by the Ph.D. program director. Subjects and bridge course examples include:

Programming and data structure (e.g. CS 280 or CS 505)

Advanced Calculus (e.g. MATH 211)

Probability and Statistics (e.g. MGMT 216 or MATH 333)

Basic business knowledge (e.g. MGMT 492)

Section I Core Courses

MGMT 682	Business Research Methods I	3
MGMT 782	Business Research Methods II	3
MGMT 635	Data Mining and Analysis	3
or CS 634	Data Mining	
CS 631	Data Management System Design	3
or IS 631	Enterprise Database Management	

Section II: Core Electives (At least two courses)

MGMT 735	Deep Learning in Business	3
MRKT 766	Seminar in Marketing Analytics	3
MGMT 740	Innovation & Entrepreneurship	3
FIN 780	Theory and Practice of Financial Research	3

Section III: Core Electives- MATH (At least one course)

~~MATH 664~~	~~Methods for Statistical Consulting~~	~~3~~
MATH 660	Introduction to statistical Computing with SAS and R	3
MATH 644	Regression Analysis Methods	3
MATH 662	Probability Distributions	3
MATH 678	Stat Methods in Data Science	3
MATH 680	Advanced Statistical Learning	3
MATH 691	Stochastic Processes with Applications	3
MATH 699	Design and Analysis of Experiments	3

Section IV: Electives

BDS 725	Independent Study I	3

BDS 726	Independent Study II	3
ACCT 615	Management Accounting	3
ECON 610	Managerial Economics	3
HRM 601	Organizational Behavior	3
HRM 630	Managing Technological and Organizational Change	3
MGMT 620	Management of Technology	3
MGMT 630	Decision Analysis	3
MGMT 640	New Venture Management	3
MGMT 641	Global Project Management	3
MGMT 650	Knowledge Management	3
MGMT 660	Managing Supply and Value Chains	3
MGMT 670	International Business	3
MGMT 680	Entrepreneurial Strategy	3
MGMT 686	Corporate Governance	3
MGMT 691	Legal and Ethical Issues in a Digital World	3
MGMT 692	Strategic Management	3
MIS 625	Management Strategies for E-Commerce	3
MIS 645	Information Systems Principles	3
MIS 648	Decision Support Systems for Managers	3
MIS 680	Management Science	3
MRKT 620	Global Marketing Management	3
MRKT 631	Marketing Research	3
MRKT 636	Design and Development of High Technology Products	3
MRKT 638	Sales Management for Technical Professionals	3
MRKT 645	Digital Marketing Strategy	3
FIN 600	Corporate Finance I	3
FIN 610	Global Macro Economics	3
FIN 611	Intro to Topics in Fin Tech	3
FIN 616	Data Driven Financial Modeling	3
FIN 620	Adv Financial Data Analytics	3
FIN 624	Corporate Finance II	3
FIN 626	Financial Investment Institutions	3
FIN 627	International Finance	3
FIN 634	Mergers, Acquisitions, and Restructuring	3

FIN 641	Derivatives Markets	3
FIN 650	Investment Analysis and Portfolio Theory	3
CS 610	Data Structures and Algorithms	3
CS 644	Introduction to Big Data	3
CS 675	Machine Learning	3
CS 677	Deep Learning	3
CS 732	Advanced Machine Learning	3
CS 782	Pattern Recognition and Applications	3
CS 786	Special Topics	3
ECE 744	Optimization for Communication Networks	3
ECE 788	Selected Topics in Electrical and Computer Engineering	3
IS 650	Data Visualization and Interpretation	3
IS 657	Spatiotemporal Urban Analytics	3
IS 661	User Experience Design	3
IS 665	Data Analytics for Info System	3
IS 684	Business Process Innovation	3
IS 688	Web Mining	3
IS 698	Special topics in Information Systems	3
IS 735	Social Media	3
EM 602	Management Science	3
EM 640	Distribution Logistics	3
IE 621	Systems Analysis and Simulation	3
IE 650	Advanced Topics in Operations Research	3
IE 673	Total Quality Management	3
IE 659	Supply Chain Engineering	3

A student entering the program with only a Bachelor's degree in related areas shall take 36 credits of advanced courses (600-level and 700-level) beyond the Bachelor's degree with the approval by the Ph.D. program director. The 36 credits shall include core and elective courses, in addition to the credits for dissertation research. Among the 36 credits, at least 12 credits must be 700-level courses.

A student entering the program with a Master's degree or above in the related areas shall take 21 credits of advanced courses (600-level and 700-level) or equivalent with the approval by the Ph.D. program director. Students with strong credentials in business and/or data science and with a Master's degree may be approved to take 18 credits of advanced courses, subject to the approval by the Ph.D. committee. At least 12 credits must be 700-level courses.

The required course credits listed above are those in addition to the credits for dissertation research (BDS 792B and BDS 790A).

GPA

Students must maintain a cumulative GPA of 3.0 or higher. As per current NJIT policy, students receiving financial support, as assistantship and fellowship, for the first time must have a cumulative GPA of 3.5 or higher. To continue receiving support, they must maintain a cumulative GPA of at least 3.0

Qualifying Exams

All Ph.D. students are required to take Core Course Qualifying Exams by the end of year one and must pass the Core Course Qualifying Exams by the end of year two. The Core Course Qualifying Exams covers subject matter drawn from the core courses.

All Ph.D. students are required to take Subject Qualifying Exam by the end of year two. Each Subject Qualifying Exam covers a subject area based on the student's research interest.

Dissertation Requirements

Registration

In addition to the required course credits listed above, students must meet Ph.D. dissertation requirements. Students must register BDS 792B for dissertation proposal and BDS 790A for dissertation. The requirement of BDS 792B and BDS 790A credits are described at: http://www5.njit.edu/graduatestudies/content/new-phd-credit-requirements/ and https://catalog.njit.edu/graduate/academic-policies-procedures/.

Dissertation Advisor

Students are recommended to choose a dissertation advisor as soon as possible, but no later than 3 months after passing the Core Course Qualifying Exams.

Dissertation Proposal Defense

The dissertation proposal must be defended in a public forum successfully either by the end of the third year in the Ph.D. program or four semesters after registering for the first time in the 792 pre-doctoral research course, whichever occurs earlier.

Dissertation Defense

PhD students must defend the dissertation successfully by the end of the sixth year in the Ph.D. program.

Please refer to the following website for other institution-wide policies and procedures for Ph.D. programs: https://catalog.njit.edu/graduate/academic-policies-procedures/

Other Requirements

Ph.D. students are required to register each semester for a 0-credit course: BDS 791 Doctoral Seminar. Full-time students must attend BDS 791 seminars each semester unless justifiable reasons are approved by the program director in advance. Part-time students are expected to attend at least 50% of the BDS 791 seminars in their first year. They may be asked to perform alternative work assigned by the program director in lieu of attending seminars.

In their first year, Ph.D. students are required to take a 0-credit course: INTD 799 Responsible Conduct of Research and receive a Satisfactory grade.

Is licensure required of program graduates to gain employment?

Will the institution seek accreditation for this program?

Add any additional information you would like brought to the attention of CUE/ CGE here	The were errors made when entering the changes in March. The attached file is what was approved. The changes presented here are based on what was approved.

Attach any additional information you would like brought to the attention of CUE/ CGE here: Uploaded Files: Revised Doctoral Curriculum.docx

Reviewer
Comments

Dismissal

Students may be dismissed from graduate ~~gtudies~~ studies for cause at any time. Cause shall include, but is not limited to:

- Failing to meet the conditions of admission.

- Failing to maintain a cumulative GPA of at least 3.0 after completing one semester or attempting at least 9 credits.

- Failing to make satisfactory progress toward a degree.

- Failing to meet the requirements for graduation.

- Failing a required or repeated course more than once.

- Failing to satisfy requirements for project, thesis, or dissertation within the required time limits.

- Failing doctoral qualifying examination for the second time.

- ~~and similar examinations~~Not completing a PhD program milestone (qualifying examination, proposal defense, final dissertation defense) within the prescribed time limit. ~~required for continuing studies in the program, or failing to take examinations within prescribed time limits.~~

- Professional conduct offenses as defined in the NJIT Code of Professional Conduct.

- Making a false representation relating to admission, registration, or the awarding of financial support.

- Failure to pay all tuition, fees and other charges within the required time limits.

Dismissal is noted on the permanent academic record.

Decisions relating to a graduate student's academic status are made in accordance with regulations approved by the faculty and ~~its standing committees~~the Provost's office.

PhD students cannot appeal dismissal decisions that relate to PhD program milestones. Students who disagree with their dismissal that relates to any ~~a decision~~other reason(s) should attempt to resolve the matter with ~~those immediately responsible~~their academic advisor. When a matter cannot be resolved at this level, students should appeal to the Chairperson of the department and then to the Dean of their school or college.