FAU

FLORIDA ATLANTIC UNIVERSITY

NEW/CHANGE PROGRAM REQUEST
Graduate Programs

Department Mathematical Sciences

College Science

UGPC Approval _____
UFS Approval _____
Banner _____
Catalog _____

Program Name

Master of Science with Major in Applied Mathematics and Statistics

☐ **New Program***

☑ **Change Program***

Effective Date *(TERM & YEAR)*

Fall 2022

Please explain the requested change(s) and offer rationale below or on an attachment.

This proposal requests to terminate the Master of Science with Major in Applied Mathematics and Statistics (AMST) program since we have proposed to merge the Master of Science in Applied Mathematics and Statistics (AMST) program with the MS in Mathematics program with five concentrations: pure mathematics, applied analysis, biostatistics, cryptology and information security, and financial mathematics. Consequently the catalog entries for the MS in AMST program should be removed from the university catalog.

Rationale: Due to low enrollment and graduates, the AMST program is struggling to sustain its operation and faces constant scrutiny from State University System. It is very reasonable and feasible for us to merge the AMST program with MS in Mathematics with the specified five concentrations, which will give our graduate students including PhD students the flexibility of obtaining MS in various fields. We shall keep the four concentrations in applied analysis, biostatistics, cryptology and information security, and financial mathematics from the AMST program. The original MS in Mathematics would become "pure mathematics" concentration in the merged program. Thus the original MS in AMST program should be terminated.

Teach-out plan: There are 4 students (two full-time and two part-time) left in the AMST program. They are expected to finish within the next 2 years. The courses specified in the AMST program will still be offered as part of other graduate degree programs in the Department of Mathematical Sciences.

*All new programs and changes to existing programs must be accompanied by a catalog entry showing the new or proposed changes.

Faculty Contact/Email/Phone

Hongwei Long/ hlong@fau.edu / 561-297-0810

Consult and list departments that may be affected by the change(s) and attach documentation

Approved by		***Date***
Department Chair	A C Locke	11/18/21
College Curriculum Chair	Christopher Beetle — Digitally signed by Christopher Beetle Date: 2021.11.23 19:56:13 -05'00'	
College Dean	William David Kalie	11/29/21
UGPC Chair		
UGC Chair		
Graduate College Dean		
UFS President		
Provost		

Email this form and attachments to UGPC@fau.edu 10 days before the UGPC meeting.

STATE UNIVERSITY SYSTEM OF FLORIDA

Board of Governors, State University System of Florida
ACADEMIC DEGREE PROGRAM TERMINATION FORM
In Accordance with BOG Regulation 8.012

INSTITUTION: Florida Atlantic University

PROGRAM NAME: Applied Mathematics and Statistics

DEGREE LEVEL(S): M
(B., M., Ph.D., Ed.D., etc.)

CIP CODE: 27.0301
(Classification of Instructional Programs)

ANTICIPATED TERMINATION TERM: Fall 2022
(First term when no new students will be accepted into the program)

ANTICIPATED PHASE-OUT TERM: Fall 2023
(First term when no student data will be reported for this program)

Please use this form for academic program termination. The form should be approved by the University Board of Trustees (UBOT) prior to submission to the Board of Governors, State University System of Florida for consideration. Please fill out this form completely for each program to be terminated in order for your request to be processed as quickly as possible. Attach additional pages as necessary to provide a complete response. In the case of baccalaureate or master's degree programs, the UBOT may approve termination in accordance with BOG Regulation 8.012, and submit this form to the Board of Governors, Office of Academic and Student Affairs. For doctoral level programs, please submit this form with all appropriate signatures for Board of Governor's consideration. The issues outlined below should be examined by the UBOT when approving program terminations.

1. Provide a narrative rationale for the request to terminate the program.

Due to low enrollment and graduates, the AMST (Applied Mathematics and Statistics) program is struggling to sustain its operation and faces constant scrutiny from State University System. It is very reasonable and feasible for us to merge the AMST program with MS in Mathematics, which will give our graduate students the flexibility of obtaining MS in various fields. We shall keep the four concentrations in applied analysis, biostatistics, cryptology and information security, and financial mathematics from the AMST program. The original MS in Mathematics would become "pure mathematics" concentration in the merged program.

2. **Indicate on which campus(es) the program is being offered and the extent to which the proposed termination has had or will have an impact on enrollment, enrollment planning, and/or the reallocation of resources.**

The AMST program is being offered at the Boca campus of FAU. We don't expect any impact on enrollment, enrollment planning, and the reallocation of resources since the prospective students interested in applied mathematics and statistics will be able to apply for the revised MS in Mathematics program which has been proposed to merge with the AMST program.

3. **Explain how the university intends to accommodate any students or faculty who are currently active in the program scheduled to be terminated. State what steps have been taken to inform students and faculty of the intent to terminate the program.**

The university will continue to offer all the courses specified in the AMST program so that students who are currently active in the program can graduate timely. Faculty who are currently active in the AMST program will not be affected since they will continue their duties in the revised MS in Mathematics program. The intention to terminate the AMST program has been communicated to students via email and faculty via email and departmental meetings.

4. **Please provide the date when the teach-out plan was submitted to SACSCOC. Include a copy of the notification letter with your submission.**

5. **Provide data (and cite sources) on the gender and racial distribution of students in and faculty affiliated with the program. For faculty, also list the rank and tenure status of all affected individuals.**

The gender and racial distribution of students in the program (data provided by the Graduate College) are: Male 4, Female 0; Black 1, White (not Hispanic or Latino) 3. Gender and racial distribution of faculty affiliated with the program (data provided by the Department of Mathematical Sciences) are: Male 25, Female 2; Asian or Pacific Islander 7, Black 0, Hispanic 0, White 20. Faculty will not be affected by the termination of the AMST program since all of them will continue their duties in the revised MS in Mathematics program.

6. **Identify any potential negative impact of the proposed action on the current representation of females, minorities, faculty, and students in the program.**

There will be no any potential negative impact of the proposed action on the current representation of females, minorities, faculty, and students in the program since we have proposed to merge the AMST program with the MS in Mathematics program.

7. **If this is a baccalaureate program, please explain how and when the Florida College System (FCS) institutions have been notified of its termination so that students can be notified accordingly.**

A. Locke, Chair, Math Sci Dept	11/18/21
Requestor/Initiator	Date
Signature of Campus EO Officer	Date
Signature of College Dean	Date
Signature of President or Vice President for Academic Affairs	Date
Signature of Chair of the Board of Trustees	Date
Date Approved by the Board of Trustees	

FLORIDA ATLANTIC UNIVERSITY

NEW/CHANGE PROGRAM REQUEST
Graduate Programs

UGPC Approval _____
UFS Approval _____
Banner _____
Catalog _____

Department Mathematical Sciences

College Science

Program Name

Master of Science with Major in Mathematics

☐ **New Program***

☑ **Change Program***

Effective Date
(TERM & YEAR)

Fall 2022

Please explain the requested change(s) and offer rationale below or on an attachment.

This proposal requests to merge the Master of Science in Applied Mathematics and Statistics (AMST) program with the MS in Mathematics program with five concentrations: pure mathematics, applied analysis, biostatistics, cryptology and information security, and financial mathematics.

Rationale: Due to low enrollment and graduates, the AMST program is struggling to sustain its operation and faces constant scrutiny from State University System. It is very reasonable and feasible for us to merge the AMST program with MS in Mathematics with the specified five concentrations, which will give our graduate students including PhD students the flexibility of obtaining MS in various fields. We shall keep the four concentrations in applied analysis, biostatistics, cryptology and information security, and financial mathematics from the AMST program. The original MS in Mathematics would become "pure mathematics" concentration in the merged program.

*All new programs and changes to existing programs must be accompanied by a catalog entry showing the new or proposed changes.

Faculty Contact/Email/Phone

Hongwei Long/ hlong@fau.edu / 561-297-0810

Consult and list departments that may be affected by the change(s) and attach documentation

Approved by		***Date***
Department Chair	JC Locke	11/18/21
College Curriculum Chair	Christopher Beetle Digitally signed by Christopher Beetle Date: 2021.11.23 19:56:41 -05'00'	
College Dean		
UGPC Chair		
UGC Chair		
Graduate College Dean		
UFS President		
Provost		

Email this form and attachments to UGPC@fau.edu 10 days before the UGPC meeting.

Master of Science with Major in Mathematics

This program is designed to provide a foundation for mathematical work and application of mathematics in scientific or technical fields and industry ~~as well as for doctoral study in mathematics~~. It should normally take a full-time student two years to complete. Five concentrations are offered: pure mathematics, applied analysis, biostatistics, cryptology and information security, and financial mathematics. Students can enter an accelerated joint-graduate program in mathematics and electrical engineering, leading to an M.S. degree in mathematics and a Ph.D. in electrical engineering. See the graduate advisors for details.

Admission Requirements
In addition to meeting the University graduate admission requirements (including a score of at least 155 on the quantitative reasoning section of the GRE), applicants must have a bachelor's degree in mathematics or coursework that includes the equivalent of Introduction to Advanced Mathematics ~~Modern Analysis,~~ Modern Algebra, and Probability and Statistics 1, as well as computer competency. Applicants who do not meet all of the requirements will still be considered for conditional admission.

Degree Requirements~~, Non-Thesis Option~~
To complete the M.S. degree in Mathematics ~~without thesis~~, the candidate must complete at least 30 credits of graduate coursework and satisfy the following criteria in addition to University requirements:

1. Earn ~~30~~ at least 24 credits in courses specified in a degree concentration, pre-approved by the graduate advisor in mathematics, at least 15 credits of all credits applied to the degree must be at the 6000 level ~~of which at least 12 are in mathematics~~;

2~~. Pass MAA 5228, MAA 5229 (Introductory Analysis 1, 2) and MAS 5311, MAS 5312 (Introductory Abstract Algebra 1, 2) with a 3.0 GPA; and~~ If pre-approved by the department graduate committee, up to 12 credits of FAU coursework from outside of the Department of Mathematical Sciences may count toward the degree.

3. ~~Complete a master's examination. The exam should be scheduled during the semester before the anticipated completion of coursework for the degree. Students should contact the departmental graduate director to schedule the exam.~~

~~If pre-approved by the department graduate committee, up to 6 credits of FAU coursework from outside of the Department of Mathematical Sciences may count toward the degree.~~

Complete one of the following three capstone options:

a. Successfully complete and defend a master's thesis, earning at least 6 credits of MAT 6971 (Master's Thesis);

b. Successfully complete and report on an Industrial Internship, earning at least 6 credits;

c. Successfully complete a Master's examination. The exam should be scheduled during the semester before the anticipated completion of coursework for the degree. Students should contact the departmental graduate director to schedule the exam.

~~**Degree Requirements, Thesis Option**~~
~~To complete the M.S. degree with thesis, the candidate must satisfy the following criteria in addition to University requirements:~~

~~1. Aside from thesis credit, earn 24 credits in courses pre-approved by the graduate advisor in mathematics, at least 9 credits of which are in 6000 level mathematics courses;~~

~~2. Pass at least three of MAA 5228, MAA 5229 (Introductory Analysis 1, 2) and MAS 5311, MAS 5312 (Introductory Abstract Algebra 1, 2) with a 3.0 GPA; and~~

~~3. Successfully complete and defend a master's thesis, earning at least 6 credits of MAT 6971 (Master's Thesis).~~

~~If pre-approved by the department graduate committee, up to 9 credits of FAU coursework from outside of the Department of Mathematical Sciences may count toward the degree.~~

~~**Core Courses - 9 credits for both Thesis and Non-Thesis Options**~~		
~~*Select three of the four following courses*~~		
~~Introductory Analysis 1~~	~~MAA 5228~~	~~3~~
~~Introductory Analysis 2~~	~~MAA 5229~~	~~3~~
~~Introductory Abstract Algebra 1~~	~~MAS 5311~~	~~3~~
~~Introductory Abstract Algebra 2~~	~~MAS 5312~~	~~3~~
~~**Thesis - 6 credits minimum**~~		
~~Master's Thesis~~	~~MAT 6971~~	~~6~~
~~**Thesis Electives - 15 credits**~~		
~~*Select 15 credits at the 5000 or 6000 level from the Mathematical Sciences Department. A minimum of 9 credits must be at the 6000 level. Students may complete up to 6 credits outside of the department with approval of an advisor.*~~		
~~**Non-Thesis Electives - 21 credits**~~		
~~*Select 21 credits at the 5000 or 6000 level from the Mathematical Sciences Department. A minimum of 15 credits must be at the 6000 level. Students may complete up to 6 credits outside of the department with approval of an advisor.*~~		

Capstone Options		
Thesis - 6 credits		
Master's Thesis (may be taken over multiple terms)	MAT 6971	1-6
Internship - 6 credits		
Internship in Applied Mathematics	MAP 6941	1-6
Non-Thesis, Non-Internship - 6 credits		
Select 6 credits of graduate courses at the 6000-level approved by the department and complete a Master's exam.		
Concentration Options		
Pure Mathematics - 24 credits		
Common Core Course		
Linear Algebra	MAS 5145	3
Additional Core Courses -9 credits, select three of the following four courses		
Introductory Analysis 1	MAA 5228	3
Introductory Analysis 2	MAA 5229	3
Introductory Abstract Algebra 1	MAS 5311	3
Introductory Abstract Algebra 2	MAS 5312	3
At least four elective courses - 12 credits		
Select 12 credits at the 5000 or 6000 level from the Mathematical Sciences Department. A minimum of 9 credits must be at the 6000 level.		
Applied Analysis - 24 credits		
Common Core Course		
Linear Algebra	MAS 5145	3

Additional three core courses - 9 credits		
Introductory Analysis 1	MAA 5228	3
Computational Mathematics	MAD 6403	3 **or**
Numerical Analysis	MAD 6407	3
Ordinary Differential Equations	MAP 6336	3 **or**
Partial Differential Equations	MAP 6345	3
At least four additional elective courses, 12 credits		
Introduction to Data Science	CAP 5768	3
Multivariable Analysis	MAA 5105	3
Introductory Analysis 2	MAA 5229	3
Real Analysis	MAA 6306	3
Complex Analysis 1	MAA 6406	3
Introduction to Functional Analysis	MAA 6506	3
Computational Mathematics	MAD 6403	3
Numerical Analysis	MAD 6407	3
Introduction to Dynamical Systems and Chaos 1	MAP 6211	3
Ordinary Differential Equations	MAP 6336	3
Partial Differential Equations	MAP 6345	3
General Topology 1	MTG 6316	3
Regression Analysis	STA 6236	3
Mathematical Statistics	STA 6326	3
Mathematical Probability	STA 6444	3
Applied Time Series Analysis	STA 6857	3
Biostatistics - 24 credits		
Common Core Course		
Linear Algebra	MAS 5145	3
Additional three core courses -9 credits		
Biostatistics	STA 5195	3
Mathematical Statistics	STA 6326	3
Mathematical Probability	STA 6444	3
At least four elective courses, 12 credits		
Introduction to Data Science	CAP 5768	3
Data Mining and Machine Learning	CAP 6673	3
Multivariable Analysis	MAA 5105	3
Numerical Analysis	MAD 6407	3
Statistical Computing	STA 6106	3
Survival Analysis	STA 6177	3
Biostatistics - Longitudinal Data Analysis	STA 6197	3
Applied Statistical Methods	STA 6207	3
Regression Analysis	STA 6236	3
Topics in Probability and Statistics (Stochastic Calculus)	STA 6446	3

Applied Time Series Analysis	STA 6857	3
Cryptology and Information Security- 24 credits		
Common Core Course		
Linear Algebra	MAS 5145	3
Additional three core courses- 9 credits		
Introduction to Cryptology and Information Security	MAD 5474	3
Cryptanalysis	MAD 6478	3
Coding Theory	MAD 6607	3
Select three courses (9 credits) from the following		
Introductory Analysis 1	MAA 5228	3
Introductory Analysis 2	MAA 5229	3
Introductory Abstract Algebra 1	MAS 5311	3
Introductory Abstract Algebra 2	MAS 5312	3
Mathematical Statistics	STA 6326	3
Mathematical Probability	STA 6444	3
At least one elective course		
Computer Data Security	CIS 6370	3
Distributed Systems Security	CIS 6375	3
Analysis of Algorithms	COT 6405	3
Secret Sharing Protocols	COT 6427	3
Randomized Algorithms	COT 6446	3
Computer Networks	CNT 5008	3
Cyber Security: Measurement and Data Analysis	CTS 6319	3
Information Theory	EEL 6532	3
Enumerative Combinatorics	MAD 6206	3
Graph Theory	MAD 6307	3
Computational Mathematics	MAD 6403	3
Cryptography	MAD 6477	3
Algebraic Number Theory	MAS 6215	3
Algebraic Curves	MAS 6315	3
Commutative Algebra	MAS 6333	3
Topics in Algebra	MAS6396	3
Special Topics	MAT 6933	1-4
Mathematical Statistics	STA 6326	3
Mathematical Probability	STA 6444	3
Financial Mathematics - 24 credits		
Common Core Course		
Linear Algebra	MAS 5145	3
Additional six core courses- 18 credits		

Introductory Analysis 1	MAA 5228	3
Mathematical Statistics	STA 6326	3
Mathematical Probability	STA 6444	3
Topics in Probability and Statistics (Stochastic Calculus)	STA 6446	3
Applied Time Series Analysis	STA 6857	3
Directed Independent Study	STA 6907	1-4
At least one elective course		
Data Mining and Machine Learning	CAP 6673	3
Financial Markets	FIN 6246	3
Financial Management	FIN 6406	3
Portfolio Theory	FIN 6525	3
Multivariable Analysis	MAA 5105	3
Introductory Analysis 2	MAA 5229	3
Statistical Computing	STA 6106	3
Applied Statistical Methods	STA 6207	3
Regression Analysis	STA 6236	3
Topics in Probability and Statistics	STA 6446	3
Directed Independent Study	STA 6907	3