

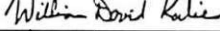

 <b>FLORIDA ATLANTIC UNIVERSITY</b>	<b>NEW/CHANGE PROGRAM REQUEST</b> <b>Graduate Programs</b>		UGPC Approval _____ UFS Approval _____ Banner _____ Catalog _____
	<b>Department</b> Mathematical Sciences  <b>College</b> Schmidt College of Science		
<b>Program Name</b> MS with Major in Applied Mathematics and Statistics	<input type="checkbox"/> <b>New Program*</b>  <input checked="" type="checkbox"/> <b>Change Program*</b>	<b>Effective Date</b> (TERM & YEAR) Fall 2020	
<b>Please explain the requested change(s) and offer rationale below or on an attachment.</b>  In this proposal, we request: <ul style="list-style-type: none"> <li>To add the track "Applied Analysis"</li> <li>To change course requirements of the track "Biostatistics"</li> </ul> Rationale: <ul style="list-style-type: none"> <li>When the program was created in 2002, "Continuous Modeling" was one of the tracks. The track was discontinued due to low enrollment in courses. Now the department has more robust courses at both undergraduate and graduate levels as well as more faculty and students engaging in research in these areas. To accommodate the faculty's research directions and demands from the graduate students, we wish to restore the track, under the more inclusive title "Applied Analysis."</li> <li>The revision of the course requirement for the existing track "Biostatistics" is to make it more flexible for students to complete the degree.</li> <li>The "Cryptography" and the "Financial Mathematics" tracks remain the same, but there are some editorial clarifications.</li> </ul>			
<b>Faculty Contact/Email/Phone</b> Yuan Wang / <a href="mailto:ywang@fau.edu">ywang@fau.edu</a> / (561) 297-3317		<b>Consult and list departments that may be affected by the change(s) and attach documentation</b>  NA	
<b>Approved by</b> Department Chair  College Curriculum Chair  2020.03.06 11:41:29 -05'00' College Dean  UGPC Chair <u>Paul R. Peluso</u> UGC Chair <u>Paul R. Peluso</u> Graduate College Dean  UFS President _____ Provost _____		<b>Date</b> Feb 25, 2020  March 9, 2020 03/27/2020 03/27/2020  <small>Digitally signed by member: 8ED423C9-A9FA-4DA0-B0B9-C422E945C5E7 7852D92B-2334-43D3-B364-BB8C8A5BEE19          Date: 2020.03.30 16:51:14 -04'00'</small>	

Email this form and attachments to [UGPC@fau.edu](mailto:UGPC@fau.edu) 10 days before the UGPC meeting.

GRADUATE COLLEGE

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### Academic Justification

In this proposal we request the change of the MS program in Applied Mathematics and Statistics by:

- Adding the track “Applied Analysis”
- Changing course requirements of the Biostatistics track

*The Applied Analysis track:* When the MS program was created in 2002, “Continuous Modeling” was one of the tracks. The track was discontinued due to low enrollment in courses. Now the department has a more robust selection of courses at both undergraduate and graduate levels. Courses such as MAD 6407 Numerical Analysis, MAD 6403 Computational Math, MAP 6336 Ordinary Differential Equations, MAP 6345 Partial Differential Equations etc., are offered regularly. It would also be natural for students in our PhD program with research areas such as dynamical systems, biomathematics, computational analysis, to complete an MS Along the Way from this track. To accommodate the faculty’s research directions and demands from the graduate students, we wish to restore the track, under the more inclusive title “Applied Analysis.”

All courses required for this track are currently listed in the university catalog. It does not require any new resources.

*Course change for the Biostatistics track:* All courses to be added are currently listed in the university catalog and regularly offered. The main motivation is to enrich the course selection for the program to make the program more attractive and productive.

Catalog Description

**Master of Science with Major in Applied Mathematics and Statistics**

The purpose of this program is to prepare students for the application of mathematics in industry and scientific research. ~~Three~~ Four tracks are offered: **applied analysis**, biostatistics, cryptology and information security, and financial mathematics.

**Admission Requirements**

Admission requirements for the M.S. in Applied Mathematics and Statistics are the same as for the M.S. in Mathematics.

**Degree Requirements**

To complete the M.S. degree in Applied Mathematics and Statistics, the candidate must complete at least 30 credits of graduate coursework and satisfy the following criteria in addition to University requirements:

1. Earn at least 24 credits in courses specified in a degree track, pre-approved by the graduate advisor in mathematics, at least 15 credits of which are at the 6000 level (for details, see the graduate advisor ~~or the website~~);
2. If preapproved 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 capstone project with the following three options:**  
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.

<b>Capstone Options</b>		
<i>Thesis - 6 credits</i>		
Master's Thesis (may be taken over multiple terms)	MAT 6971	1-6
<i>Internship - 6 credits</i>		
Internship in Applied Mathematics	MAP 6941	1-6
<i>Non-Thesis, Non-Internship - 6 credits</i>		
<i>Select an additional 6 credits of coursework from the Track Options</i>		
<i>Select six credits of graduate courses approved by the department and complete an MS exam</i>		



<b>Track Options</b>		
<i>Applied Analysis - 24 credits</i>		
<i>Core – four courses (12 credits )</i>		
Introductory Analysis 1	MAA 5228	3
Linear Algebra	MAS 5145	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
<i>At least four additional courses (12 credits)</i>		
Introduction to Data Science	CAP 5786	3
Multivariable Analysis	MAA 5105	3
Introductory Analysis 2	MAA 5229	3
Real Analysis	MAA 6306	3
Complex Analysis I	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
<i>Biostatistics - 24 credits</i>		
<i>Core – 18 9 credits</i>		
Biostatistics	STA 5195	3
Survival Analysis	STA-6177	3
Regression Analysis	STA-6236	3
Mathematical Statistics	STA 6326	3
Mathematical Probability	STA 6444	3

Applied Statistical Methods	STA 6207	3
<i>At least <del>two</del> five elective courses (15 credits)</i>		
Introduction to Data Science	CAP 5786	3
Data Mining and Machine Learning	CAP 6673	3
Multivariable Analysis	MAA 5105	3
Numerical Analysis	MAD 6407	3
Linear Algebra	MAS 5145	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
<i>Cryptology - 24 credits</i>		
<i>Core - 9 credits</i>		
Introduction to Cryptology and Information Security	MAD 5474	3
Cryptanalysis	MAD 6478	3
Coding Theory	MAD 6607	3
<i>Select three courses (9 credits) from the following</i>		
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
<i>At least two elective courses (6 credits)</i>		
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
Linear Algebra	MAS 5145	3
Algebraic Number Theory	MAS 6215	3
Algebraic Curves	MAS 6315	3
Commutative Algebra	MAS 6333	3
Topics in Algebra (Group Theory)	MAS 6396	3
Special Topics (Elliptic Curves / Computational Group Theory)	MAT 6933	1-4 3
Mathematical Statistics	STA 6326	3
Mathematical Probability	STA 6444	3
<b>Financial Mathematics - 24 credits</b>		
<i>Core - 18 credits</i>		
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 (Financial Mathematics 1)	STA 6907	1-4 3
<i>At least two elective courses (6 credits)</i>		
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
Linear Algebra	MAS 5145	3
Statistical Computing	STA 6106	3
Applied Statistical Methods	STA 6207	3

Regression Analysis	STA 6236	3
Topics in Probability and Statistics (Topics in Stochastic Processes)	STA 6446	3
Directed Independent Study ( <b>Financial Mathematics 2</b> )	STA 6907	<del>4</del> 3

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