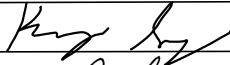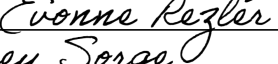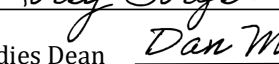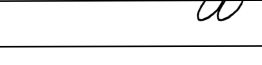| FAU FLORIDA ATLANTIC UNIVERSITY	**NEW/CHANGE PROGRAM REQUEST** **Undergraduate Programs**	UUPC Approval _12/4/23_ UFS Approval _____ Banner _____ Catalog _____
	Department Mathematical Science **College** Science	

Program Name Bachelor of Science degree in Mathematics	☐ **New Program*** ✓ **Change Program***	**Effective Date** *(TERM & YEAR)* Spring 2024

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

The Department of Mathematical Sciences at Florida Atlantic University (FAU) proposes to revise the BS program in Mathematics. The primary goal is to increase enrollment in mathematics degree programs at FAU. This program revise will update our curriculum offerings to improve student preparedness for the demands of the current labor market, and better align the programs with the expertise of the core faculty groups within the department.

We propose to have four concentrations in the BS program:

(1) Pure Mathematics
(2) Mathematical Cryptology
(3) Mathematical Biology
(4) Statistics and Data Science

(for more details, please see the attached note.)

*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 Yuan Wang/ywang@fau.edu/(561) 297-2672	**Consult and list departments that may be affected by the change(s) and attach documentation**

Approved by		*Date*
Department Chair	*[signature]*	11/21/2023
College Curriculum Chair	*[signature]*	11/21/23
College Dean	*Evonne Rezler*	11/28/23
UUPC Chair	*Korey Sorge*	12/4/23
Undergraduate Studies Dean	*Dan Meeroff*	12/4/23
UFS President		
Provost		

Email this form and attachments to mjenning@fau.edu seven business days before the UUPC meeting.

Catalog Change (texts in blue are newly added)

Mathematics
Bachelor of Science (B.S.)

The B.S. program in Mathematics consists of four concentrations:
- (1) Pure Mathematics
- (2) Mathematical Cryptology
- (3) Mathematical Biology
- (4) Statistics & Data Science

To complete the B.S. program, students will complete the specific courses for one of the concentrations. All students will take two courses in calculus; at least one statistics course; Discrete Mathematics, and at least one programming course.

(1) Pure Mathematics Concentration

Course	Code	Credits
~~Calculus 1~~ Calculus with Analytic Geometry 1	MAC 2311	4
~~Calculus 2~~ Calculus with Analytic Geometry 2	MAC 2312	4
~~Calculus 3~~ Calculus with Analytic Geometry 3	MAC 2313	4
General Chemistry 1 and Lab or	CHM 2045&L	or
General Physics 1 and Lab	PHY 2048&L	4-5
Discrete Mathematics	MAD 2104	3
Introduction to Computational Math	MAD 2502	3
Differential Equations 1	MAP 2302	3
Matrix Theory	MAS 2103	3
Introduction to Advanced Mathematics	MHF 3202	3
~~Mathematical Problem Solving~~	~~MAT 4937~~	~~3~~
Linear Algebra 2	MAS 4107	3
~~Modern Analysis~~	~~MAA 4200~~	~~3~~
Vector Calculus	MAS 3156	3
Modern Algebra	MAS 4301	3
Introductory Complex Analysis	MAA 4402	3
Probability and Statistics 1	STA 4442	3
Introductory Analysis 1	MAA 4226	3

Introductory Abstract Algebra 1	MAS 4304	3
Upper-division math electives		~~12~~ 9
~~Mathematics~~ Concentration Total (excluding science)		57

(2) Mathematical Cryptology Concentration

Calculus and Analytic Geometry 1	MAC 2311	4
Calculus and Analytic Geometry 2	MAC 2312	4
Calculus and Analytic Geometry 3	MAC 2313	4
General Chemistry 1 and Lab	CHM 2045&L	or
General Physics 1 and Lab	PHY 2048&L	4-5
Discrete Mathematics	MAD 2104	3
Matrix Theory	MAS 2103	3
Programming 1	COP 2220	3
Introductory Number Theory	MAS 3203	3
Introduction to Advanced Mathematics	MHF 3202	3
Probability and Statistics 1	STA 4442	3
Cryptography and Information Security	CIS 4362	3
Modern Algebra	MAS 4301	3
Programming 2	COP 3014	3
Data Structures and Algorithm Analysis	COP 3530	3
Approved upper-division math electives, choose 2. For example, but not limited to the following (courses marked with * apply to the undergraduate Cybersecurity Certificate program)		6
Computational Statistics	STA 3100	
Vector Calculus	MAS 3156	
Engineering Mathematics 1	MAP 3305	
Numerical Methods	MAD 3400	
Linear Algebra 2	MAS 4107	
Introduction to Methods in Complex Systems	MAP 4112	
Mathematics of Cybersecurity*	MAP 4190	
Mathematics for Cryptography*	MAS 4206	
Graph Theory	MAD 4301	
Topology for Data Science	MTG 4325	
Numerical Analysis 1	MAD 4401	
Introduction to Coding Theory*	MAD 4605	
Post-quantum Cryptography (New course, in the approval cycle)	MAD 4475	
Cryptography of Blockchain (New course, in the approval cycle)	MAD 4476	

Approved upper-division EECS Electives in the Cybersecurity Certification program, choose 3. For example, but NOT limited to the following: 9

Introduction to Database Structure	COP 3540	
Python Programming	COP 4045	
Design and Analysis of Algorithms	COT 4400	
Theory of Computation	COT 4402	
Introduction to Cryptographic Engineering	CDA 4321	
Applied Cryptography and Security	CIS 4634	
Network and Data Security	CNT 4411	
Applied Machine Learning and Data Mining	CAP 4612	
Introduction to Deep Learning	CAP 4613	
Introduction to Artificial Intelligence	CAP 4630	
Computer Operating Systems	COP 4610	
Introduction to Data Mining and Machine Learning	CAP 4770	

Concentration Total (excluding science) 57

(3) Mathematical Biology Concentration

Mathematics for Biological Sciences 1 (New Course)	MAP 2483	or
Methods of Calculus	MAC 2233	or
Life Science Calculus 1	MAC 2241	or
Calculus with Analytic Geometry 1	MAC 2311	3 - 4
Mathematics for Biological Sciences 2 (New Course)	MAP 2484	4
Introductory Statistics	STA 2023	3
Introduction to Computational Mathematics	MAD 2502	3
Discrete Mathematics	MAD 2104	3
Biological Principles	BSC 1010	3
Biodiversity	BSC 1011	3
General Chemistry 1	CHM 2045	3
General Chemistry 2	CHM 2046	3
Applied Mathematical Modeling	MAP 4103	3
Introduction to Biostatistics	STA 3173	3
Genetics	PCB 3063	or
Principles of Ecology	PCB 4043	4
Artificial Intelligence Applications in Biology	IDS 4139	3
Applied Machine Learning and Data Mining	CAP 4612	3
Upper-division math electives (choose 2)		6

Upper-division science electives (choose 2) with Prefix BOT, BSC, MCB, OCB, PCB, ZOO, BCH, CHM, PHY, PHZ, or IDS   6

Research Intensive Elective (Choose 1)   3

RI: Statistical Learning	STA 4241
RI: Introduction to Data Science	CAP 3786
RI: Industrial Problems in Applied Math	MAP 4913
RI: Neurobiology of Learning and Memory	PSB 4810
RI: Neurophysiology	PCB 4832C

Concentration Total (including science)   **59-60**

Note: For this concentration, MAP 2484 can be replaced by MAC 2312, MAP 2302, and MAS 2103.

(4) Statistics & Data Science Concentration

Calculus and Analytic Geometry 1	MAC 2311	4
Calculus and Analytic Geometry 2	MAC 2312	4
Calculus and Analytic Geometry 3	MAC 2313	4
General Chemistry 1 and Lab or	CHM 2045&L	or
General Physics 1 and Lab	PHY 2048&L	4 - 5
Discrete Mathematics	MAD 2104	3
Matrix Theory	MAS 2103	3
Introduction to Computational Mathematics	MAD 2502	3
Programming 1	COP 2220	3
Introduction to Advanced Mathematics	MHF 3202	3
Modern Algebra	MAS 4301	3
Introduction to Complex Analysis	MAA 4402	3
Probability and Statistics 1	STA 4442	3
Applied Statistics 1 and Applied Statistics Lab	STA 4234 and STA 4202L	3
Programming 2	COP 3014	3
Data Structures and Algorithm Analysis	COP 3530	3
Approved Math Electives, choose 2, at least one upper-division		6
Concentration Electives, choose 2:		6
RI: Introduction to Data Science	CAP 3786	
RI: Statistical Learning	STA 4241	
Topology for Data Science	MTG 4325	
Applied Mathematical Modeling	MAP 4103	
Industrial Problems in Applied Math	MAP 4913	
Introduction to Deep Learning	CAP 4613	
Introduction to Data Mining and Machine Learning	CAP 4770	

Introduction to Data Science and Analytics	CAP 4773
Time series	STA 4853
Computational Statistics	STA 3100
Introduction to Methods in Complex Systems	MAP 4112
Theory of Computation	COT 4420

Concentration Total (excluding science)   **57**

Required Minimum GPA 2.5

Notes:

1. Upper-division mathematics electives: These electives must be chosen from courses offered by the Department of Mathematical Sciences and numbered 3000 or higher. The following courses may not be used as upper-division mathematics electives: STA 3163, ~~STA 3173~~, STA 3949, MAT 3949, MAP 4945, or STA 4821.

2. In calculation of the departmental GPA, where relevant, the highest grade in the course will be used.

3. Because of overlap in course content, Mathematics majors may receive credit for at most one course in each of the following pairs: (MAP 2302, MAP 3305), (MAP 4303, MAP 4306), (STA 4443, STA 4032).

4. The upper-division mathematics courses required for these programs that are completed at FAU must be completed with at least a 2.2 GPA (B.A. program) or 2.5 GPA (B.S. program).

5. Any mathematics course taken at another institution must be completed with a grade of at least ~~"C-"~~ "C" to be considered part of either baccalaureate program.

6. Mathematical Sciences majors are required to consult with their advisors at least once a year.