

CURRICULUM CHANGE PROPOSAL

APPROVAL PAGE

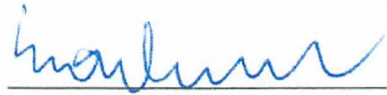
Proposal Title: Change of statistics to data science concentration in mathematics

College: Science

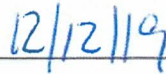
Department: Mathematical Sciences

DEPARTMENT CHAIR

I have read the enclosed proposal and approve this proposal on behalf of the department.



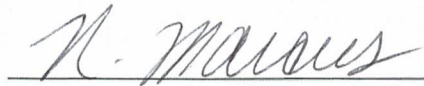
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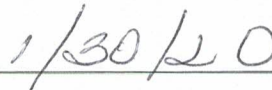
Date

COLLEGE CURRICULUM COMMITTEE CHAIR

I have read the enclosed documents and approve the proposal on behalf of the college curriculum committee.



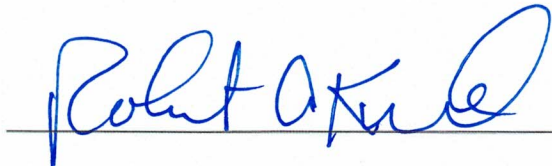
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Date

COLLEGE DEAN

I have read the enclosed documents and approve the proposal on behalf of the college. I certify that the necessary funds will be allocated by the college in support of this proposal.



Signature



Date

UNDERGRADUATE CURRICULUM CHANGE MEMO

Date: 10/11/2019

From: Amy Wagler, Department of Mathematical Sciences

Through: Christina Mariani, Department of Mathematical Sciences

Through: Robert A. Kirken, College of Science

To: Carla Ellis, Chair of UGCC

Proposal Title: Change of statistics to data science concentration in mathematics

Throughout the nation, data science professionals are a needed asset for supporting the high-tech industry and existing major players in government, utilities and banking. Data scientists are essential for organizations wishing to make use of data for informing change in their organization. Similarly, in the state of Texas, there is a growing demand for data science professionals. Data scientists are essential in a variety of fields, such as banking, finance, health care, security, and other fields.

The existing concentration in statistics would train a degree seeker from any field in the essentials of statistical modeling and analysis. However, in order to meet this industry demand, we proposed changes to the concentration which include the following:

- 1) Change the concentration name from statistics to data science. This will attract a greater variety of students who want to develop data analytic skills.
- 2) Allow for multiple pathways for the concentration that allows flexibility for students of varying background, interests and goals. This concentration revision allows students to choose from a set of relevant courses, rather than routing all students into the same set of courses.
- 3) Provide courses in statistical programming and data mining to undergraduates. This revised concentration will allow students to take (optionally) newly offered senior level classes in statistical programming and data mining. These are in high demand at the undergraduate level and we have piloted the programming course with undergraduates.

Bell Hall 100 747-5536

The University of Texas at El Paso

El Paso, Texas 79968-0509

Bachelor of Science Degree Plan

Note: Unofficial - Based on New Catalog

Mathematics - Statistics Concentration

Minimum Requirements (120/37)

Name

Address

Major: Mathematics

Minor: None

Department Chair: **Dr. Maria Cristina Mariani**

Director of Advising: Dr. Tina Garza

At Least C Grades in Lower Division Math Courses & Core Curriculum

At Least C Grades in Lower Division Courses in the Major & Minor

At Least 2.0 GPA Overall and in the Major

Departmental Advisor: Dr. Andrew Pownuk

Pre-Requisites Locaed on Next Page

REQUIREMENTS ***

	Items	Subjects	Has	Needs
A	General Education			
	(Minimum "C" grades required)			
1	Communication:			6
	COMM 1611, RWS 1601			
	RWS 1301, RWS 1302, ENGL 1313,			
	For students whose secondary education was not in English, ESOL 1311, ESOL 1312			
2	Mathematics			
	MATH 1411 (See Block B)			
	MATH 1312 (See Block B)			
3	Life and Physical Sciences **			8
	PHYS 2420 and PHYS 2421			
4	Language, Philosophy, & Culture			
	ENGL 2311, 2312 2313, 2314, 2318,			3
	FREN 2322, RS 1301, SPAN 2340,			
	HIST 2301, 2302, PHIL 1301, 2306			
	RS 1301, SPAN 2340, WS 2300, WS 2350			
5	Creative Arts			
	ART 1300, ARTH 1305, ARTH 1306.			3
	DANC 1304, MUS 1324, MUSL 1327,			
	MUSL 2321, THEA 1313, FILM 1390			
6	American History			
	HIST 1301			3
	HIST 1302			3
7	Government/Political Science			
	POLS 2310			3
	POLS 2311			3
8	Social and Behavioral Sciences			
	ANTH 1301, 1302, 1310, 2320, CE 2326,			3
	COMM 2350, 2372, ECON 2303, 2304,			
	EDPC 1301, EDU 1342, ENGL 2320,			
	GEOG 1310, LING 2320, 2340, PSYC 1301,			
	SOC 1301, SOCI 1310			
9	Component Area Option			
	BUSN 1301, COMM 1301, COMM 1302,			6
	CS 1310, CS 1320, SCI 1301, UNIV 1301			
B	MAJOR: Mathematics - Statistics Concentration			
	MATH 1411			4
	MATH 1312			3
	MATH 2313			3
	MATH 2325 or MATH 2300			3
	STAT 2480			4
	MATH 3325			3
	STAT 3330			3
	MATH 4326 or MATH 3323			3
	MATH 4329			3
	STAT 4380			3
	STAT 4385			3
	At least 3 courses chosen from the following:			9
	MATH 3300, 3319, 3320, 3323, 3327, 3328,			
	MATH 3329, 3335, 3341, 4325, 4329, 4336			
	STAT 3384			
	With approval, CS upper-division courses,			
	MATH 4370			
	STAT 4474			4
	STAT 4329			3
C	Minor Optional - Not Required			15 -12
	At least 12 upper division semester hours.			
	Requires apapproval. Work with an advisor			
	to come with the courses that will best			
	support your major.			
	At least 9 upper division semester hours.			
	Requires apapproval. Work with an advisor			
	to come with the courses that will best			
	support your major.			
	Other Science Requirements			
D	One sequence from the following:			8
	BIOL 1305-1107, BIOL 1306-1108,			
	or CHEM 1304-11-5, CHEM 1306-1106,			
	or GEOL 1313-1103, GEOL 1314-1104			
E				
	Additional Required Course(s)			
	RWS 3359			3
	CS 1301-1401 or 1320			3
	CS 1301/1101			4
	SCI 1301			3
F	Electives			
	Additional Upper-Division Semester Hours			12
	Additional Semester Hours			0
TOTAL HOURS			0	120

COMMENTS:

This mathematics (statistics concentration) degree plan is just a sample. Your individualized degree plan may differ.

Dr. Nancy Marcus, Associate Dean, College of Science

COURSES	Pre-Requisites
BIOL 1305-1107 - General Biology and Lab	MATH 0311 or Higher
BIOL 1306-1108 - Organismal Biology and Lab	BIOL 1306, MATH 0311 or Higher
CHEM 1305-1105 - General Chemistry I and Lab	MATH 1509 (can be taken concurrently)
CHEM 1306-1106 - General Chemistry II and Lab	MATH 1508, CHEM 1305-1105
CS 1320 - Computer Programming for Scientists and Engineers	Math 1508 or Higher
CS 1301-11-1 - Introduction to Computer Science and lab	Math 1508 or Higher
GEOL 1313-1103 - Introduction to Physical Geology	None
GEOL 1314-1104 - Introduction to Historical Geology	GEOL 1313
MATH 1312 - Calculus II	MATH 1411
MATH 1411 - Calculus I	MATH 1508 or Placement
MATH 2300 - Discrete Mathematics	MATH 1411 or MATH 1312 or MATH 2313
MATH 2313 - Calculus III	MATH 1312 or MATH 2326
MATH 2325 - Introduction to Higher Mathematics	None
MATH 3300 - History of Mathematics	MATH 1411
MATH 3319 - Elementary Number Theory	MATH 3325
MATH 3320 - Actuarial Mathematics	STAT 3330
MATH 3323 - Matrix Algebra	MATH 1312
MATH 3325 - Principles of Mathematics	MATH 1312
MATH 3327 - Applied Algebra	None
MATH 3328 - Foundations of Mathematics	MATH 3325
MATH 3329 - Geometry	MATH 3325
MATH 3335 - Applied Analysis I	MATH 2313
MATH 3341 - Introduction to Analysis	MATH 3325
MATH 4325 - Modern Algebra	MATH 3325
MATH 4326 - Linear Algebra	MATH 3325
MATH 4329 - Numerical Analysis	MATH 3323
MATH 4336 - Applied Analysis II	MATH 2326
MATH 4370 - Topics Seminar	Junior and Senior Status
PHYS 2420 or PHYS 2320-2120 - Introductory Mechanmics and Lab	Lecture and Lab Together, MATH 1411
PHYS 2421 or PHYS 2321-2121 - Introductory Electromagnetism and Lab	Lecture and Lab Together, MATH 1312, PHYS 2320-2120
STAT 2480 - Probability and Statistics	MATH 1320 or MATH 1508 or MATH 1411
STAT 3330 - Probability	MATH 1312
STAT 3381 - Noparametric Statistics	STAT 2480
STAT 4380 - Statistics I	STAT 3330
STAT 4385 - Applied Regression Analysis	STAT 2480

BS in Mathematics with a Concentration in ~~Statistics~~ Data Science

Code	Title	Hours
Designated Core		
Required Courses: ¹		
CS 1401 or CS 1320	Intro to Computer Science Computer Programming Sci/Engr	4
PHYS 2420	Introductory Mechanics	4
PHYS 2421	Introductory Electromagnetism	4
RWS 3359	Technical Writing	3
University Core Curriculum		
Complete the University Core Curriculum requirements.		42
Statistics Concentration		
Required Courses:		
MATH 1312	Calculus II	3
MATH 1411	Calculus I	4
MATH 2313	Calculus III	3
MATH 3325	Principles of Mathematics	3
MATH 4329	Numerical Analysis	3
STAT 2480	Elementary Statistical Methods	4
STAT 3330	Probability	3
STAT 4380	Statistics I	3
STAT 4385	Applied Regression Analysis	3
MATH 2300 or MATH 2325	Discrete Mathematics Intro. to Higher Mathematics	3

Code	Title	Hours
MATH 3323	Matrix Algebra	3
or MATH 4326	Linear Algebra	3
STAT 4329	Intro to Data Mining	4
STAT 4474	Statistical Programming	
Select nine hours from the following:- ³		9
CS 3195	Junior Professional Orientation	
CS 3320	Comp Arch II: Adv. Design /Imp	
CS 3331	Adv. Object-Oriented Programng	
CS 3350	Automata/Computabi/Formal Lang	
CS 3360	Design/Implementation Prog Lan	
CS 3370	Computer Graphics	
CS 3432	Comp Arch I: Comp Org/Design	
CS 4173	Computer Science Internship	
CS 4181	Undergraduate Seminar	
CS 4273	Computer Science Internship	
CS 4310	Software Eng: Requirements Eng	
CS 4311	Software Eng: Design & Implmnt	
CS 4316	Computer Networks	
CS 4317	Human-Computer Interaction	
CS 4320	Artificial Intelligence	
CS 4330	Mobile Application Development	
CS 4339	Secure Web-Based Systems	
CS 4342	Data Base Management	
CS 4351	Computer Security	
CS 4352	Compilers and Interpreters	
CS 4365	Topics in Soft Computing	

Code	Title	Hours
<u>CS 4371</u>	Computer Science Problems	
<u>CS 4373</u>	Computer Science Internship	
<u>CS 4374</u>	Software Construction	
<u>CS 4375</u>	Theory of Operating Systems	
<u>CS 4376</u>	Comp Desn-Mkng & Risk Analysis	
<u>CS 4377</u>	Cyber-Sec for Critical Op Tech	
<u>CS 4379</u>	Software Reverse Engineering	
<u>CS 4387</u>	Software Integration and V&V	
<u>CS 4390</u>	Special Topics in Computer Sci	
<u>CS 4392</u>	Rsrch Methods/Computer Science	
<u>CS 4393</u>	Senior Project	
<u>MATH 3300</u>	History of Mathematics	
<u>MATH 3319</u>	Elementary Number Theory	
<u>MATH 3320</u>	Actuarial Mathematics	
<u>MATH 3323</u>	Matrix Algebra	
<u>MATH 3327</u>	Applied Algebra	
<u>MATH 3328</u>	Foundations of Mathematics	
<u>MATH 3329</u>	Geometry	
<u>MATH 3335</u>	Applied Analysis I	
<u>MATH 3341</u>	Introduction to Analysis	
<u>MATH 4325</u>	Modern Algebra	
<u>MATH 4329</u>	Numerical Analysis	
<u>MATH 4336</u>	Applied Analysis II	
<u>STAT 3381</u>	Nonparametric Statistics	
Other Science Requirements		

Code	Title	Hours
Choose one sequence from the Following		8
BIOL 1305 & BIOL 1107	General Biology and Topics in Study of Life I	
And		
BIOL 1306 & BIOL 1108	Organismal Biology and Organismal Biology Laboratory	
OR		
CHEM 1305 & CHEM 1105	General Chemistry and Laboratory for CHEM 1305	
And		
CHEM 1306 & CHEM 1106	General Chemistry and Laboratory for CHEM 1306	
OR		
GEOL 1313 & GEOL 1103	Intro to Physical Geology and Lab for GEOL 1313	
And		
GEOL 1314 & GEOL 1104	Intro to Historical Geol and Lab for GEOL 1314	
Minor (Optional)		
Take additional semester hours with advisor approval		
Upper Division Requirement		
Select a total of thirty-seven hours of upper division course work³		37
Total Hours		120
Additional Required Courses		10
CS 1301/1101		4
RWS 3359		3
SCI 1301		3

Minor (Optional)	18
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Complete an 18-hour minor or 18 hours of electives, at least 10 must be upper-division

Electives	6
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Take an addition 6 hours of upper-division electives

<u>Upper Division Requirement</u>
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<u>Select a total of thirty-seven hours of upper division course work.³</u>	<u>37</u>
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<u>Total Hours</u>	<u>120</u>
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