CURRICULUM GUIDE

3+2 in Data Science and Statistics, B.S. (Discrete Mathematics Combination) and Applied Mathematics, M.A. (All Concentrations) 2023-2024

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Department of Mathematics and Statistics 521 Lancaster Ave. 312 Wallace Bldg. Richmond, KY 40475 859-622-5942

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The schedule below is just ONE EXAMPLE how you can arrange your class schedule. Free electives may vary, depending on your choice of classes. It is important to check with your advisor for specific changes that may need to be made to personalize your schedule.

Fall Semester		Spring Semester	
SCO 100M	1	STA 340	3
STA 270	4	MAT 239	3
STA 270L (recommended)	(1)	MAT 244	4
^G MAT 234 (fulfills Gen. Ed. 2)	4	Gen. Ed 1B (<i>ENG 102</i>)	3
Gen. Ed. 1A (ENG 101)	3	Gen. Ed 5B (Soc. & Behav.)	3
Gen. Ed. 1C (<i>Comm</i> .)	3		-
TOTAL	15 (16)	TOTAL	16
CSC 170, 174, 189, <u>or</u> 190	3	MAT 306	3
Gen. Ed. 4 (<i>Nat. Sci.</i>)	3	^G PHI 130 <u>or</u> ^G 130S (fulfills Gen. Ed. 3B)	
Gen. Ed. 6 (<i>Diversity</i>)	3	<u>or</u> PHI 362	3
Free Elective (MAT 254 recommended)	4	Gen. Ed. 4 (Nat. Sci.)	3
Free Elective (upper division)	3	Gen. Ed. 5A (<i>History</i>)	3
.,, ,		Gen. Ed. 6 (<i>Diversity</i>)	3
		Free Elective	3
TOTAL	16	TOTAL	18
MAT 720 <u>or</u> STA 720 (also fulfills MS		ENG 300 <u>or</u> 300S	3
requirement)	3	STA 470	3
Domain Knowledge Course #1	3	STA 775 (also fulfills MS requirement)	3
Gen. Ed. 3A (<i>Arts</i>)	3	Domain Knowledge Course #2 (upper	
Free Elective (upper division)	3	division)	3
Free Elective <u>or</u> Gen. Ed. 3B	3	Free Elective (upper division)	3
Free Elective	3	Free Elective	3
TOTAL	18	TOTAL	18
MAT 865 (also fulfills MS requirement)	3	MAT 866	3
CSC/DSC/MAT/STA Elective	3	Concentration Course	3
STA 498	3	Concentration Course	3
Free Elective (upper division)	3		
Free Elective	3		
Free Elective	3 (4)		
<u>(Undergraduate Complete = 120 hrs)</u>			
TOTAL	18 (19)	TOTAL	9
MAT 898	3	Advisor Approved Elective	3
1.	2	Advisor Approved Elective	0-3
Concentration Course	5	Auvisor Approved Liective	
 Concentration Course Advisor Approved Elective <i>(reauired to</i>) 	5	Autisti Approved Liective	
 Concentration Course Advisor Approved Elective (required to maintain full-time araduate status if 	5		
 Concentration Course Advisor Approved Elective (required to maintain full-time graduate status if GA has been awarded) 	0-3		
 Concentration Course Advisor Approved Elective (required to maintain full-time graduate status if GA has been awarded) 	0-3		
 Concentration Course Advisor Approved Elective (required to maintain full-time graduate status if GA has been awarded) 	0-3		
 Concentration Course Advisor Approved Elective (required to maintain full-time graduate status if GA has been awarded) 	0-3		
 Concentration Course Advisor Approved Elective (required to maintain full-time graduate status if GA has been awarded) 	0-3		
 Concentration Course Advisor Approved Elective (required to maintain full-time graduate status if GA has been awarded) TOTAL 	0-3 6-9	TOTAL	3-6
 Concentration Course Advisor Approved Elective (required to maintain full-time graduate status if GA has been awarded) TOTAL 	0-3 6-9		3-6
	Fall Semester SCO 100M STA 270 STA 270L (recommended) ^G MAT 234 (fulfills Gen. Ed. 2) Gen. Ed. 1A (ENG 101) Gen. Ed. 1C (comm.) TOTAL CSC 170, 174, 189, <u>or</u> 190 Gen. Ed. 4 (Nat. Sci.) Gen. Ed. 6 (Diversity) Free Elective (MAT 254 recommended) Free Elective (upper division) TOTAL MAT 720 <u>or</u> STA 720 (also fulfills MS requirement) Domain Knowledge Course #1 Gen. Ed. 3A (Arts) Free Elective (upper division) Free Elective <u>or</u> Gen. Ed. 3B Free Elective (upper division) Free Elective <u>s</u> MAT 865 (also fulfills MS requirement) CSC/DSC/MAT/STA Elective STA 498 Free Elective (upper division) Free Elective [Undergraduate Complete = 120 hrs] TOTAL MAT 898 Concentration Course	Fall Semester SCO 100M 1 STA 270 4 STA 270L (recommended) (1) ^G MAT 234 (fulfills Gen. Ed. 2) 4 Gen. Ed. 1A (ENG 101) 3 Gen. Ed. 1C (comm.) 3 TOTAL 15 (16) CSC 170, 174, 189, <u>or</u> 190 3 Gen. Ed. 4 (Nat. Sci.) 3 Gen. Ed. 6 (Diversity) 3 Free Elective (MAT 254 recommended) 4 Free Elective (upper division) 3 TOTAL 16 MAT 720 <u>or</u> STA 720 (also fulfills MS requirement) 3 Domain Knowledge Course #1 3 Gen. Ed. 3A (Arts) 3 Free Elective (upper division) 3 Free Elective <u>or</u> Gen. Ed. 3B 3 Free Elective <u>affective <u>or</u> Gen. Ed. 3B 3 Free Elective <u>affective <u>affective 3</u> 3 Free Elective (upper division) 3 STA 498 3 Free Elective (upper division) 3 Free Elective (upper division) 3 Free Elective (upper division) 3 Free Elective (upper division) </u></u>	Fall SemesterSpring SemesterSCO 100M1STA 340STA 2704MAT 239STA 270. (recommended)(1)MAT 244© MAT 234 (fuffills Gen. Ed. 2)4Gen. Ed. 1A (ENG 101)3Gen. Ed. 1A (ENG 102)Gen. Ed. 5B (Soc. & Behav.)Gen. Ed. 4. (Nat. Sci.)3Gen. Ed. 6 (Diversity)3Gree Elective (MAT 254 recommended)4Free Elective (MAT 254 recommended)4Gen. Ed. 4. (Nat. Sci.)Gen. Ed. 6 (Diversity)Free Elective (MAT 254 recommended)Free Elective (MAT 254 recommended)MAT 720 or STA 720 (also fulfills MSrequirement)3Domain Knowledge Course #1Gen. Ed. 3A (Arts)Gen. Ed. 3A (Arts)Gen. Ed. 3A (Arts)Free Elective (upper division)Free Elective (upper division)<

catalog for details regarding prerequisites. § A preparatory course in mathematics may be required before admission to MAT 239.

Upper division courses: All students are required to have a minimum of 42 hrs. upper division (300-level or above) courses distributed throughout Major/Supporting/Gen Ed/Free Electives categories).

Refer to the University Catalog at <u>http://www.catalogs.eku.edu/</u> regarding University and General Education Requirements.

* M.A. IN APPLIED MATHEMATICS REQUIREMENTS ON BACK

Students must choose one concentration for the M.A. in Applied Mathematics.

Course	Course Name
Number	
GENERAL EDUCATI	ON & UNIVERSITY REQUIREMENTS (37)
SCO 100M	Student Success Seminar (1)
500 100	
CORE COURSE REO	UIREMENTS (29)
MAT 239	Linear Algebra and Matrices (3)
MAT 244	Calculus II (4)
MAT 720 or	Mathematical Statistics I (3) (Fall only)
STA 720	Mathematical Statistics I (3)
MAT 865	Applied Linear Algebra (3)
STA 270	Applied Statistics I (4)
STA 340	Applied Regression Analysis (3)
STA 498	Statistics Capstone (3)
STA 775	Statistical Methods Using SAS (3)
TPLUS THREE (3) ho	urs from CSC/DSC/MAT/STA cources numbered 300 or above
(oxcluding any 249 c	aurses) STA 490 will count for only approved topics
MAIOR ELECTIVES	FOR DISCRETE MATHEMATICS COMBINATION (6)
MAJOR ELECTIVES	TOR DISCRETE MATTEMATICS COMBINATION (0)
MAT 306	Discrete Mathematics (3) (spring only)
STA 470	Applied Probability (3) (spring only)
SUPPORTING COU	RSE REQUIREMENTS (13-18)
CSC 170 or	Intro to Game Programming (3)
CSC 174 or	Introduction to Programming for Science & Engineering (3)
CSC 189 or	Computing Concepts and Programming (3)
CSC 190	Object-Oriented Programming I (3)
ENG 300 or 300S	Intro. to Technical and Professional Writing (3) (service)
^G MAT 234	Calculus I (4)
^G PHI 130 <u>or</u>	Beginning Ethics (3)
^G PHI 130S <u>or</u>	Beginning Ethics (3) (service)
PHI 362	Technology and Values (3)
SELECT TWO (2) COU	RSES from one of the following categories (Domain Knowledge
Course):	
ANTHROPOLOG	Y AND SOCIOLOGY:
*ANT 371	Primate Ecology and Sociality (3)
*SOC 232	Social Statistics (3)
*SOC 310	Population and Society (3)
*SOC 395	Research Methods in Sociology (3) (spring only)
BIOLOGY AND E	NVIRONMENTAL HEALTH SCIENCES:
*BIO 315 <u>and</u>	Genetics (4)
*BIO 533	Bioinformatics: Principles and Applications (3)
*BIO 316 and	Ecology (4)
*BIO 532	Conservation Biology (3) (spring only)
EHS 280 and	One Health: Global Environmental Public Health (3)
*EHS 370	Environmental Disease Detectives: Epidemiology (3)
COMPUTER INF	DRMATION SYSTEMS:
*BUS 304	Essentials of Management Information Systems (3)
*CIS 335	Database Management (3)
COMPLITER COM	
*CSC 310	Data Structures (3)
*(\$(212	Database Systems (3)
*INF 314	MS Office and Data Analysis (3)
GOVERNMENT	
*POL 280	Research and Writing in Political Science (3)
*POL 400W	Capstone Course in Political Science (3) (writing intensive)
*POL 440	Public Opinion and Voting Behavior (3)
GEOSCIENCES	
*GEO 351	Geoscience Data and Techniques (3)
*GEO 353	Geographic Information Systems (3)
*GEO 453	Advanced GIS (3)
*GEO 456	Remote Sensing (3)
*GEO 458	Advanced Geographic Imagery (3) (spring only)
PHYSICS	
*PHY 315	Electrical Circuits (4)
*PHY 406	Advanced Physics Laboratory (3)
*PHY 460	Classical Mechanics (4)
PSYCHOLOGY	
*PSY 240	Scientific Literacy in Psychology (3)
*PSY 315 <u>or</u>	Sensation and Perception (3)
*PSY 315L	Sensation and Perception with Lab (4)
*PSY 340W	Research Literacy in Psychology (3) (writing intensive)
TINC (2) A-	resis and inteasurements (3)
P I WO (2) Adviso	r-approved courses from a department other than the Mathematics and Statistics
Department of	wathematics and Statistics.
FREE ELECTIVES (30	-35)

^e Denotes that 3 credit hours from this course are/can be applied to fulfill a Gen. Ed. requirement.

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M.A. In Applied Mathematics: Secondary Mathematics Concentration

Course	Course Name
Number	
M.A. APPLIED	MATHEMATICS REQUIREMENTS (30)
NINE (9) hours fr	rom MAT 720 <u>or</u> STA 720, MAT 865, MAE 705 <u>or</u> STA 775 are
counted in the u	ndergraduate program.
Ω CORE COURSE	REQUIREMENTS (12)
MAT 720 <u>or</u>	Mathematical Statistics I (3) (Fall only)
STA 720	Mathematical Statistics I (3)
MAT 865	Applied Linear Algebra (3)
MAT 866	Combinatorial Optimization (3)
MAE 704 <u>or</u>	Technology for Teaching and Research (3)
STA 775	Statistical Methods using SAS (3)
SECONDARY MA	ATHEMATICS CONCENTRATION REQUIREMENTS (15)
MAT 735	Principles of Geometry (3)
PLUS SIX (6) HO	URS selected from:
MAE 750	Teaching Mathematics in the Secondary School (3) (Fall only)
MAE 843	Mathematics Intervention Strategies (3)
MAE 850	Trends and Materials in the Teaching of Mathematics (3)
MAE 870	Hierarchical Linear Modeling in Educational Research (3)
MAE 872	Mathematics in the Curriculum (3)
STA 800	Applied Statistical Inference (3)
PLUS SIX (6) HO	URS advisor-approved electives selected from 700- or 800-
level courses wit	th DSC, MAE, MAT, STA, or CSC prefixes (Electives)
CAPSTONE (3)	
MAT 898	Applied Mathematics Capstone (3)

 O No course may be counted under both core requirements and concentration requirements.

M.A. In Applied Mathematics: Data Science Concentration

Course	Course Name	
Number		
M.A. APPLIED	MATHEMATICS REQUIREMENTS (30)	
NINE (9) hours from MAT 720 <u>or</u> STA 720, MAT 865, MAE 705 <u>or</u> STA 775 are		
counted in the ur	ndergraduate program.	
Ω CORE COURSE	REQUIREMENTS (12)	
MAT 720 <u>or</u>	Mathematical Statistics I (3) (Fall only)	
STA 720	Mathematical Statistics I (3)	
MAT 865	Applied Linear Algebra (3)	
MAT 866	Combinatorial Optimization (3)	
MAE 704 <u>or</u>	Technology for Teaching and Research (3)	
STA 775	Statistical Methods using SAS (3)	
DATA SCIENCE CONCENTRATION REQUIREMENTS (15)		
DSC 780 <u>or</u>	R and Introductory Data Mining (3)	
STA 780	R and Introductory Data Mining (3)	
PLUS SIX (6) HOU	JRS selected from:	
MAE 750	Teaching Mathematics in the Secondary School (3) (Fall	
	only)	
MAE 843	Mathematics Intervention Strategies (3)	
MAE 850	Trends and Materials in the Teaching of Mathematics (3)	
MAE 870	Hierarchical Linear Modeling in Educational Research (3)	
MAE 872	Mathematics in the Curriculum (3)	
STA 800	Applied Statistical Inference (3)	
PLUS SIX (6) HOU	JRS advisor-approved electives selected from 700- or 800-	
level courses with DSC, MAE, MAT, STA, or CSC prefixes (Electives)		
CAPSTONE (3)		
MAT 898	Applied Mathematics Capstone (3)	

A No course may be counted under both core requirements and concentration requirements.

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M.A. In Applied Mathematics: Applied Mathematics and Statistics Concentration

Course	Course Name	
Number		
M.A. APPLIED	MATHEMATICS REQUIREMENTS (30)	
NINE (9) hours fr	om MAT 720 <u>or</u> STA 720, MAT 865, MAE 705 <u>or</u> STA 775 are	
counted in the u	ndergraduate program.	
Ω CORE COURSE REQUIREMENTS (12)		
MAT 720 or	Mathematical Statistics I (3) (Fall only)	
STA 720	Mathematical Statistics I (3)	
MAT 865	Applied Linear Algebra (3)	
MAT 866	Combinatorial Optimization (3)	
MAE 704 or	Technology for Teaching and Research (3)	
STA 775	Statistical Methods using SAS (3)	
APPLIED MATHE	MATICS AND STATISTICS CONCENTRATION	
REQUIREMENTS	(15)	
NINE (9) HOURS	SELECTED FROM:	
DSC 780	R and Introductory Data Mining (3)	
MAT 706	Number Theory (3)	
MAT 727	Cryptology (3)	
MAT 740	Applications of Partial Differential Equations (3)	
MAT 750	Applications of Complex Analysis (3)	
MAT 755	Graph Theory (3)	
MAT 765	Mathematics of Structural Bioinformatics (3)	
MAT 777	Introduction to Algebraic Coding Theory (3)	
MAT 853	Ordinary Differential Equations (3)	
MAT 856	Applied Mathematics (3)	
MAT 871	Numerical Analysis (3)	
MAT 880	Seminar in: (1-3)	
STA 721	Mathematical Statistics II (3)	
STA 770	Quality Control and Reliability (3)	
STA 775	Statistical Methods Using SAS (3)	
STA 780	R and Introductory Data Mining (3)	
STA 785	Experimental Design (3)	
STA 835	Linear Models (3)	
STA 840	Applied Multivariate Statistical Analysis (3)	
STA 880	Seminar in: (1-3)	
PLUS SIX (6) HOUI	RS advisor-approved electives selected from 700- or 800-level	
courses with DSC,	MAE, MAT, STA, or CSC prefixes (Electives)	
CAPSTONE (3)		

Ω No course may be counted under both core requirements and concentration requirements.