

# CURRICULUM GUIDE

## Data Science and Statistics, B.S. (Data Science Combination) and Applied Mathematics, M.A. (All Concentrations) 2022-2023

Website: [math.eku.edu](http://math.eku.edu)

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Department of Mathematics and Statistics

521 Lancaster Ave.

312 Wallace Bldg.

Richmond, KY 40475

859-622-5942

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	
<b>Freshman Year</b>	SCO 100M	1	STA 340
	STA 270	4	MAT 239
	STA 270L (recommended)	(1)	MAT 244
	° MAT 234 (fulfills Gen. Ed. 2)	4	Gen. Ed 1B (ENG 102)
	Gen. Ed. 1A (ENG 101)	3	Gen. Ed 5B (Soc. & Behav.)
	Gen. Ed. 1C (Comm.)	3	
	<b>TOTAL</b>	<b>15 (16)</b>	<b>TOTAL</b>
			<b>16</b>
<b>Sophomore Year</b>	CSC 170, 174, 189, <u>or</u> 190	3	CSC 210
	Gen. Ed. 4 (Nat. Sci.)	3	° PHI 130 <u>or</u> ° 130S (fulfills Gen. Ed. 3B)
	Gen. Ed. 6 (Diversity)	3	<u>or</u> PHI 362
	Free Elective (MAT 254 recommended)	4	Gen. Ed. 4 (Nat. Sci.)
	Free Elective (upper division)	3	Gen. Ed. 5A (History)
			Gen. Ed. 6 (Diversity)
	<b>TOTAL</b>	<b>16</b>	<b>TOTAL</b>
			<b>18</b>
<b>Junior Year</b>	MAT 720 <u>or</u> STA 720 (also fulfills MS requirement)	3	CSC 581
	Domain Knowledge Course #1	3	ENG 300 <u>or</u> 300S
	Gen. Ed. 3A (Arts)	3	STA 775 (also fulfills MS requirement)
	Free Elective (upper division)	3	Domain Knowledge Course #2 (upper division)
	Free Elective (upper division)	3	Free Elective (upper division)
	Free Elective <u>or</u> Gen. Ed. 3B	3	Free Elective
	<b>TOTAL</b>	<b>18</b>	<b>TOTAL</b>
			<b>18</b>
<b>Senior Year</b>	MAT 865 (also fulfills MS requirement)	3	MAT 866
	CSC/DSC/MAT/STA Elective	3	◆ Concentration Course
	STA 498W (ACCT)	3	◆ Concentration Course
	Free Elective (upper division)	3	
	Free Elective	3	
	Free Elective	3 (4)	
	<b>TOTAL</b>	<b>18 (19)</b>	<b>TOTAL</b>
			<b>9</b>
<b>Senior +1</b>	MAT 898	3	Advisor Approved Elective
	◆ Concentration Course	3	Advisor Approved Elective
	Advisor Approved Elective (required to maintain full-time graduate status if GA has been awarded)	0-3	
	<b>TOTAL</b>	<b>6-9</b>	<b>TOTAL</b>
			<b>3-6</b>
		<b>TOTAL HOURS TO DEGREE COMPLETION</b>	<b>144</b>

\* **PREREQUISITES:** Consult with your advisor and/or the University catalog regarding prerequisites for upper division MAT and STA courses. See University 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 <http://www.catalogs.eku.edu/> regarding University and General Education Requirements. All baccalaureate degree seeking students who enter the University are required to successfully complete one writing intensive course following completion of the ENG 102, ENG 105, or HON 102/103. Writing intensive courses are designated with the suffix "W" following the course prefix and number (e.g. HUM 300W).

**Applied Critical & Creative Thinking (ACCT) Requirement:** Chemistry majors will fulfill ACCT with: (Credit hours are incorporated into program requirements.)

### ◆ M.A. IN APPLIED MATHEMATICS REQUIREMENTS ON BACK

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

Course Number	Course Name
<b>GENERAL EDUCATION &amp; UNIVERSITY REQUIREMENTS (37)</b>	
SCO 100M	Student Success Seminar (1)
<b>CORE COURSE REQUIREMENTS (29)</b>	
MAT 239	Linear Algebra and Matrices (3)
MAT 244	Calculus II (4)
MAT 720 <u>or</u> STA 720	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 498W	Statistics Capstone (3) (writing intensive)
STA 775	Statistical Methods Using SAS (3)
† PLUS THREE (3) hours from CSC/DSC/MAT/STA courses numbered 300 or above (excluding any 349 courses). STA 480 will count for only approved topics.	
<b>MAJOR ELECTIVES FOR DATA SCIENCE COMBINATION (6)</b>	
CSC 210	Data Structures and Programming (3)
CSC 581	Machine Learning (3)
<b>SUPPORTING COURSE REQUIREMENTS (13-18)</b>	
CSC 170 <u>or</u> CSC 174 <u>or</u> CSC 189 <u>or</u> CSC 190	Intro to Game Programming (3) Introduction to Programming for Science & Engineering (3) Computing Concepts and Programming (3) Object-Oriented Programming I (3)
ENG 300 <u>or</u> 300S	Intro. to Technical and Professional Writing (3) (service)
° MAT 234	Calculus I (4)
° PHI 130 <u>or</u> ° PHI 130S <u>or</u> PHI 362	Beginning Ethics (3) Beginning Ethics (3) (service) Technology and Values (3)
<b>SELECT TWO (2) COURSES from one of the following categories (Domain Knowledge Course):</b>	
▶ <b>ANTHROPOLOGY AND SOCIOLOGY:</b>	
*ANT 371	Primate Ecology and Society (3)
*SOC 232	Social Statistics (3)
*SOC 310	Population and Society (3)
*SOC 395	Research Methods in Sociology (3) (spring only)
▶ <b>BIOLOGY AND ENVIRONMENTAL HEALTH SCIENCES:</b>	
*BIO 315 <u>and</u> *BIO 533	Genetics (4) Bioinformatics: Principles and Applications (3)
*BIO 316 <u>and</u> *BIO 532	Ecology (4) Conservation Biology (3) (spring only)
EHS 280 <u>and</u> *EHS 370	One Health: Global Environmental Public Health (3) Environmental Disease Detectives: Epidemiology (3)
▶ <b>COMPUTER INFORMATION SYSTEMS:</b>	
*BUS 304	Essentials of Management Information Systems (3)
*CIS 335	Database Management (3)
*CIS 430	Business Data Mining I (3)
▶ <b>COMPUTER SCIENCE AND INFORMATICS</b>	
*CSC 310	Data Structures (3)
*CSC 313	Database Systems (3)
*INF 314	MS Office and Data Analysis (3)
▶ <b>GOVERNMENT</b>	
*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)
▶ <b>GEOSCIENCES</b>	
*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)
▶ <b>PHYSICS</b>	
*PHY 315	Electrical Circuits (4)
*PHY 406	Advanced Physics Laboratory (3)
*PHY 460	Classical Mechanics (4)
▶ <b>PSYCHOLOGY</b>	
*PSY 240	Scientific Literacy in Psychology (3)
*PSY 315 <u>or</u> *PSY 315L	Sensation and Perception (3) Sensation and Perception with Lab (4)
*PSY 340W	Research Literacy in Psychology (3) (writing intensive)
*PSY 590	Tests and Measurements (3)
▶ TWO (2) Advisor-approved courses from a department other than the Department of Mathematics and Statistics.	
<b>FREE ELECTIVES (30-35)</b>	

° 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 Number	Course Name
<b>M.A. APPLIED MATHEMATICS REQUIREMENTS (30)</b>	
<i>NINE (9) hours from MAT 720 or STA 720, MAT 865, MAE 705 or STA 775 are counted in the undergraduate program.</i>	
<b>Ω CORE COURSE REQUIREMENTS (12)</b>	
MAT 720 <i>or</i> STA 720	Mathematical Statistics I (3) (Fall only)
MAT 865	Applied Linear Algebra (3)
MAT 866	Combinatorial Optimization (3)
MAE 704 <i>or</i> STA 775	Technology for Teaching and Research (3) Statistical Methods using SAS (3)
<b>SECONDARY MATHEMATICS CONCENTRATION REQUIREMENTS (15)</b>	
MAT 735	Principles of Geometry (3)
<b>PLUS SIX (6) HOURS selected from:</b>	
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)
<b>PLUS SIX (6) HOURS advisor-approved electives selected from 700- or 800-level courses with DSC, MAE, MAT, STA, or CSC prefixes (Electives)</b>	
<b>CAPSTONE (3)</b>	
MAT 898	Applied Mathematics Capstone (3)

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

### M.A. In Applied Mathematics: Data Science Concentration

Course Number	Course Name
<b>M.A. APPLIED MATHEMATICS REQUIREMENTS (30)</b>	
<i>NINE (9) hours from MAT 720 or STA 720, MAT 865, MAE 705 or STA 775 are counted in the undergraduate program.</i>	
<b>Ω CORE COURSE REQUIREMENTS (12)</b>	
MAT 720 <i>or</i> STA 720	Mathematical Statistics I (3) (Fall only)
MAT 865	Applied Linear Algebra (3)
MAT 866	Combinatorial Optimization (3)
MAE 704 <i>or</i> STA 775	Technology for Teaching and Research (3) Statistical Methods using SAS (3)
<b>DATA SCIENCE CONCENTRATION REQUIREMENTS (15)</b>	
DSC 780 <i>or</i> STA 780	R and Introductory Data Mining (3) R and Introductory Data Mining (3)
<b>PLUS SIX (6) HOURS selected from:</b>	
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)
<b>PLUS SIX (6) HOURS advisor-approved electives selected from 700- or 800-level courses with DSC, MAE, MAT, STA, or CSC prefixes (Electives)</b>	
<b>CAPSTONE (3)</b>	
MAT 898	Applied Mathematics Capstone (3)

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

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

Course Number	Course Name
<b>M.A. APPLIED MATHEMATICS REQUIREMENTS (30)</b>	
<i>NINE (9) hours from MAT 720 or STA 720, MAT 865, MAE 705 or STA 775 are counted in the undergraduate program.</i>	
<b>Ω CORE COURSE REQUIREMENTS (12)</b>	
MAT 720 <i>or</i> STA 720	Mathematical Statistics I (3) (Fall only)
MAT 865	Applied Linear Algebra (3)
MAT 866	Combinatorial Optimization (3)
MAE 704 <i>or</i> STA 775	Technology for Teaching and Research (3) Statistical Methods using SAS (3)
<b>APPLIED MATHEMATICS AND STATISTICS CONCENTRATION REQUIREMENTS (15)</b>	
<b>NINE (9) HOURS SELECTED FROM:</b>	
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)
<b>PLUS SIX (6) HOURS advisor-approved electives selected from 700- or 800-level courses with DSC, MAE, MAT, STA, or CSC prefixes (Electives)</b>	
<b>CAPSTONE (3)</b>	
MAT 898	Applied Mathematics Capstone (3)

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