

# Proposed Bachelor of Science in Mathematics

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# Student Learning Objectives

Students graduating with a B.S. in Mathematics will be able to understand, communicate, and apply mathematics. In particular a student will be able to:

1. Comprehend, discover, and communicate common principles from algebra, geometry, and analysis,
2. Use probability or statistics correctly and effectively,
3. Recognize, understand and also make his/her own mathematically rigorous arguments,
4. Interpret and present results to a technical audience, both in writing and verbally,
5. Describe how mathematical or quantitative based arguments effect society,
6. Modify problems to make them tractable,
7. Use technology to aid in solving problems,
8. Apply quantitative theory, modeling, or mathematical principals to other disciplines to solve problems.

Critical Thinking (1)  
Communication (1)  
Applications (2)

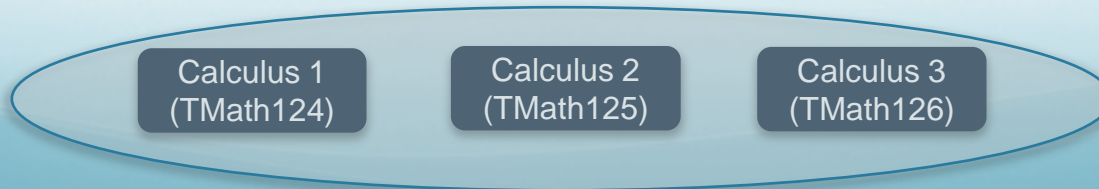
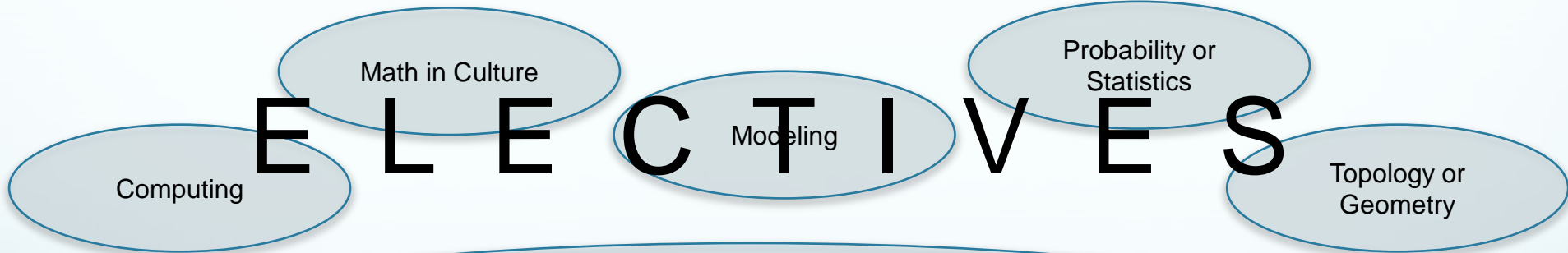
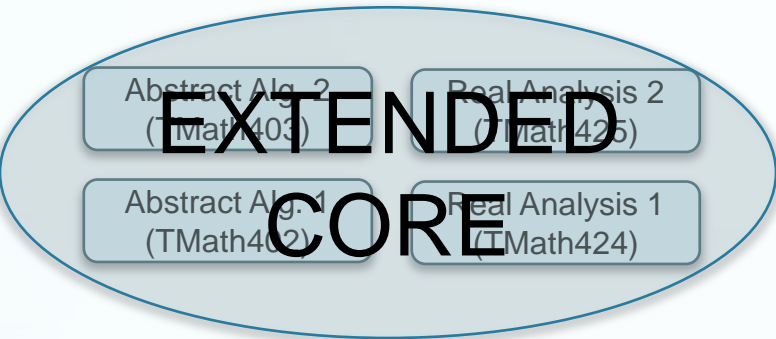
# SLO Themes

Technology (3)  
Research (4)  
Math Content

Students graduating with a B.S. in Mathematics will be able to **understand**, **communicate**, and **apply mathematics**. In particular a student will be able to:

1. **Comprehend**, **discover**, and **communicate** common principles from algebra, geometry, and analysis,
2. Use probability or statistics **correctly and effectively**,
3. **Recognize, understand and also make his/her own mathematically rigorous arguments**,
4. **Interpret** and **present** results to a technical audience, **both in writing and verbally**,
5. **Describe** how mathematical or quantitative based arguments **effect society**,
6. **Modify problems to make them tractable**,
7. Use **technology** to aid in **solving problems**,
8. **Apply quantitative theory, modeling, or mathematical principals to other disciplines to solve problems.**

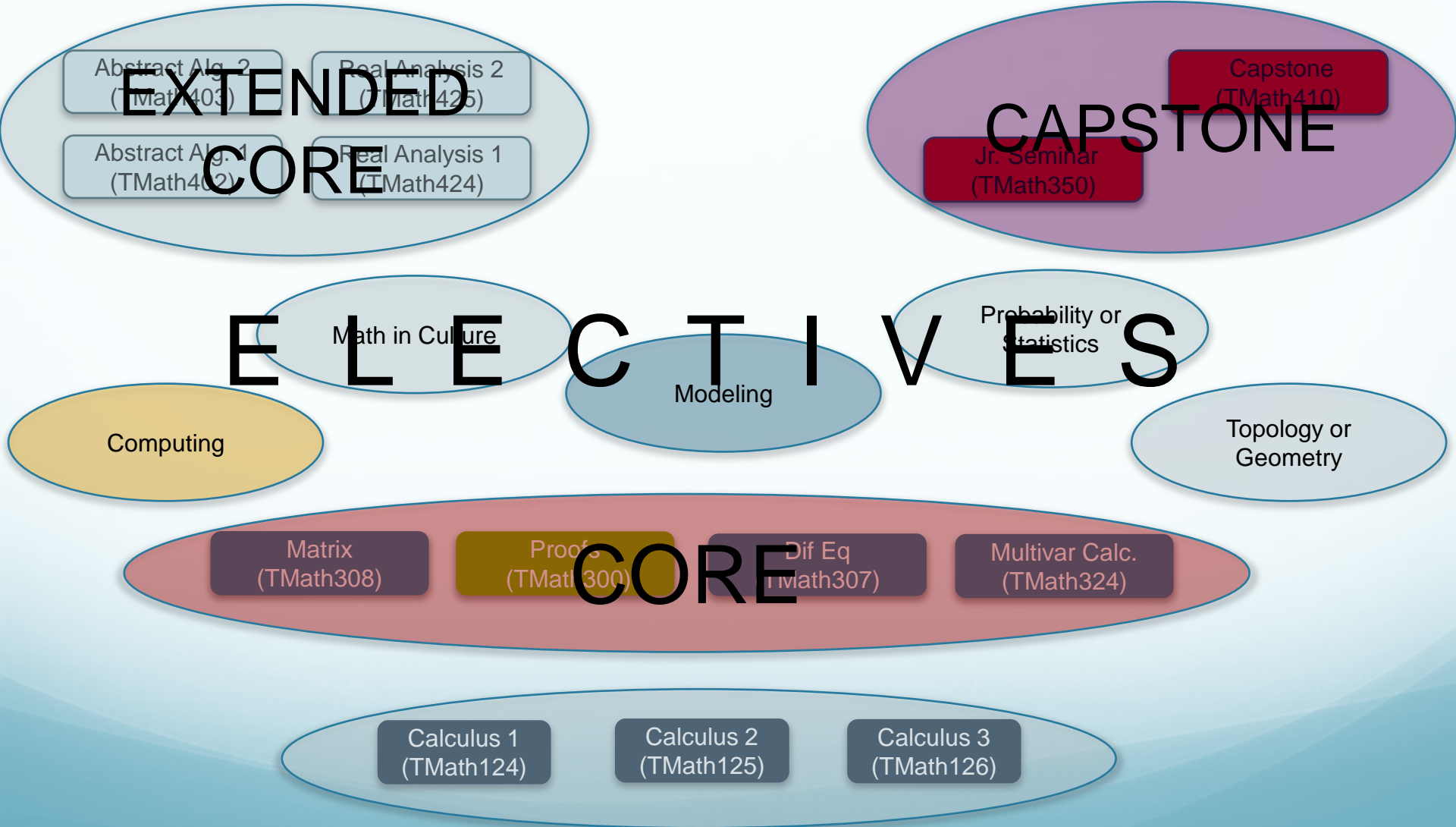
# Structure



Critical Thinking  
Communication  
Applications

Technology  
Research  
Math Content

# Cognitive Structure



# Content Suggestions

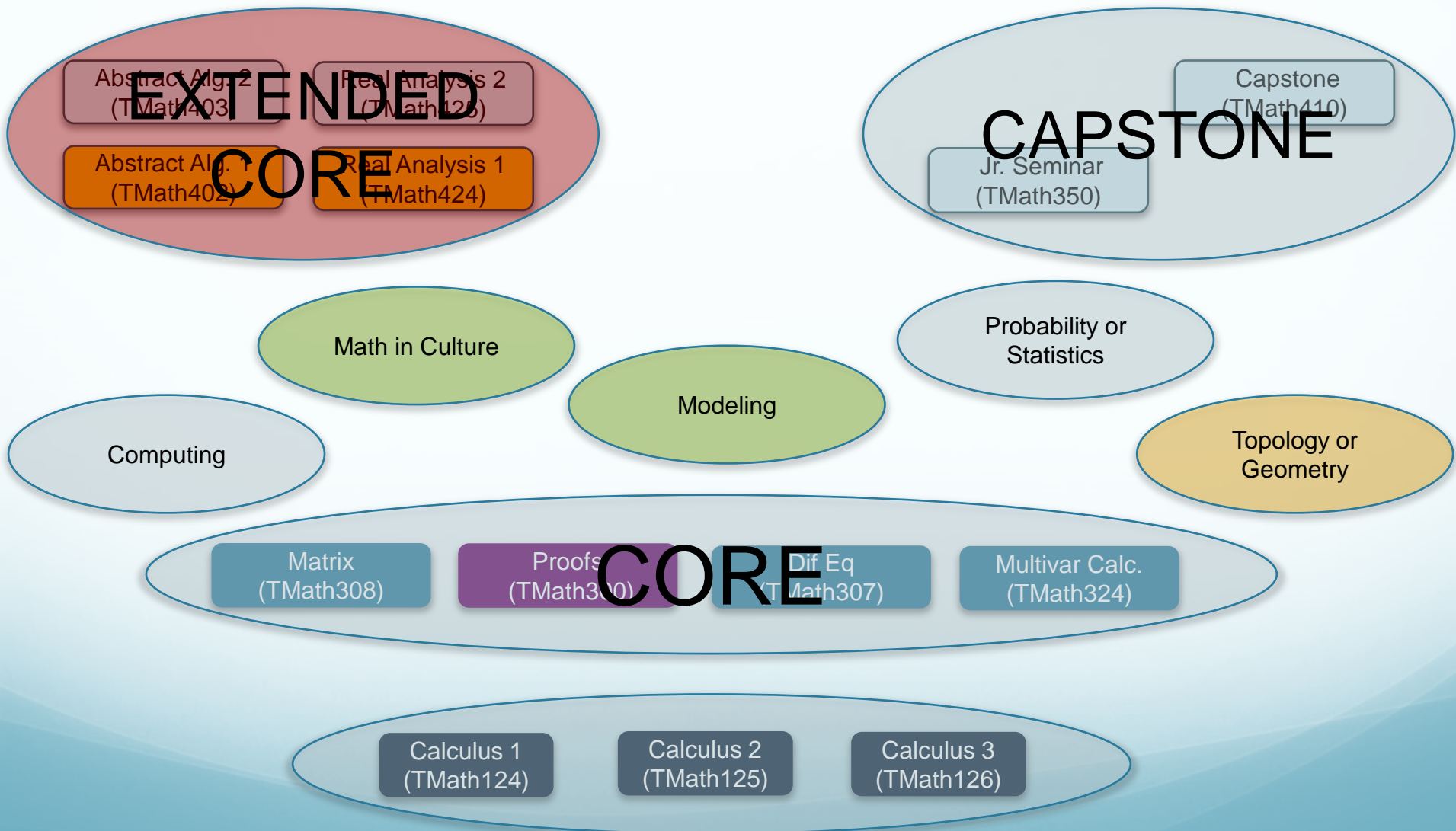
Mathematical sciences major programs should

- include concepts and methods from calculus and linear algebra.
- teach students how to read, understand, analyze, and produce proofs at increasing depth as they progress through a major.
- present key ideas and concepts from a variety of perspectives to demonstrate the breadth of mathematics. **(Breath)**
- experience mathematics from the perspective of another discipline. **(Interdisciplinary)**
- present key ideas from complementary points of view: continuous and discrete; algebraic and geometric; deterministic and stochastic; exact and approximate. **(Balance)**
- require the study of at least one mathematical area in depth, with a sequence of upper-level courses. **(Depth)**

Interdisciplinary  
Depth

Breadth  
Balance

# Content Structure



# Elective Classes

## Computing

TMATH 412 Cryptography  
TCSS 143 Fund. of Object-Oriented Programming  
TINST 310 Computational Problem Solving  
TINST 311 Database Management & Data Analysis  
TESC 453 Environmental Remote Sensing  
TCSS 142 Intro. to Programming

TESC 430  
Environmental Modeling

TMATH310  
Stats for Environ. App  
TMATH390 Prob & Stats  
in Engineering

TBUS 301  
Quant. Analysis  
for Business

## Probability/ Statistics

TURB225  
Stats for Urban Analysis  
TSOCWF 351  
Applied Stats for Soc.  
& Human Services

## Math in Culture

TCSS 325 Computers, Ethics,  
& Society  
TEDUC 473\* Math, Power,  
& Society  
TEDUC 475\* Sci., Tech., Eng.,  
Arts & Math Ed.  
For Democracy  
TEST 211 Women in Science

## Modeling

TESC 453 Env. Remote Sensing  
TESC 122 Electromagnetism  
& Oscillatory Motion

TMATH420\*  
Math History

## Topology/Geometry

TMATH 321\* Geometry  
TMATH 427\* Complex Analysis  
TMATH 441\* Topology

## Notes:

No more than 5 cr. from a class <300

\* Indicated a new course



# Flexibility

- “(Math majors) should be designed so that all students come to see math as an engaging field, rich in beauty, with powerful applications to other subjects & contemporary open questions. “ pg 1
- Content suggestion #8: Mathematical sciences major programs should offer their students an orientation to careers in mathematics.

# Pathway Examples

## Math Education focus:

	Autumn	Winter	Spring	Summer
1st year	TMATH124 Calc 1 1st year Core	TMATH 125 Calc 2 1st year Core 1st year Core	TMATH 126 Calc 3 1st year Core	
2nd year	TMATH300 Reasoning TMATH324 Multivariable	TMATH307 Dif Eq stat. elect. (TMATH390)	TMATH308 Matrix model elect. (TESC430)	
3rd year	TMATH350 Jr. Seminar TPSYCH 101	TMATH327 Real 1 geom. elect. (TMATH321) TPSYCH 321	TMATH328 Real 2 comp elect (TMATH412)	
4th year	elective (TCSS321) TIAS498 Reading	TMATH402 Alg 1 TMATH 450 Capstone	cult. elect. (TMATH420)	

## Mathematical Social Science focus:

	Autumn	Winter	Spring	Summer
1st year	TMATH124 Calc 1 1st year Core	TMATH 125 Calc 2 1st year Core 1st year Core	TMATH 126 Calc 3 1st year Core	
2nd year	TMATH300 Reasoning	TMATH307 Dif Eq stat. elect. (TBUS301)	TMATH308 Matrix model elect. (TBECON420)	
3rd year	TMATH350 Jr. Seminar TMATH324 Multivariable	TMATH402 Alg 1	TMATH403 Alg 2 comp elect (TMATH430)	
4th year	elective (TCSS321) TMATH496 Internship	TMATH327 Real 1 geom. elect. (TMATH321) TMATH 450 Capstone	cult. elect. (TEST211)	

# Pathway Examples

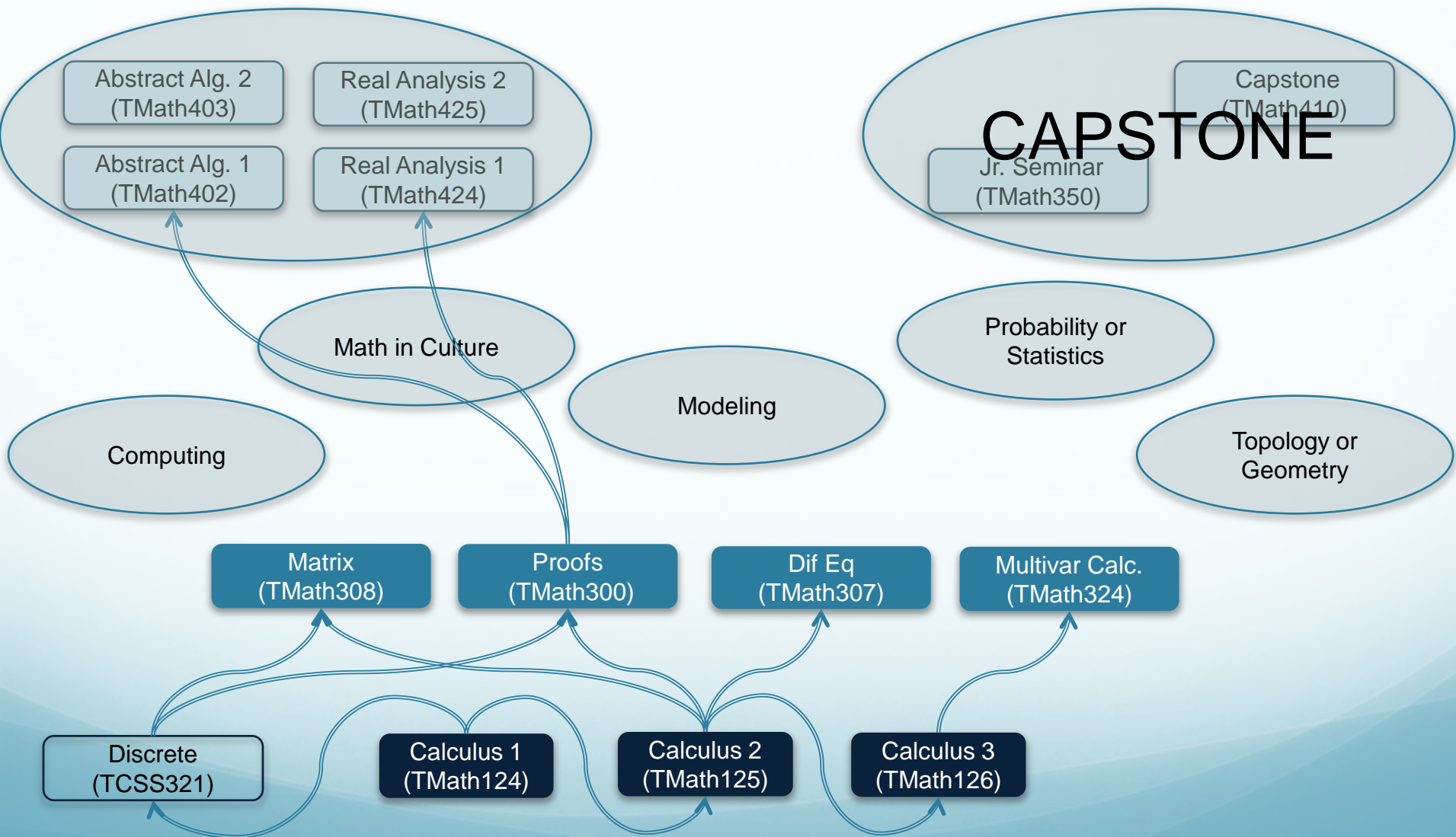
Math non-standard entry:

	Autumn	Winter	Spring	Summe
1st year	1st year Core	1st year Core 1st year Core	1st year Core TMATH 120	
2nd year	TMATH124 Calc 1	TMATH 125 Calc 2	TMATH 126 Calc 3 TMATH308 Matrix	
3rd year	TMATH300 Reasoning TMATH350 Jr. Seminar TMATH324 Multivariable	TMATH327 Real 1 TMATH307 Dif Eq	TMATH328 Real 2 comp & stat elect (TMATH390) model elect. (TBECON420)	
4th year	elect. (TCSS321) elect. (TINST310) TIAS498 Reading	TMATH402 Alg 1 TMATH 450 Capstone	geom. & cult. elect. (TMATH420)	

STEM focus:

	Autumn	Winter	Spring	Summe
1st year	1st year Core (Sc) TMATH124 Calc 1	1st year Core (Sc) elective (TCSS321)	1st year Core (Sc) TMATH308 Matrix	
2nd year	TMATH300 Reasoning comp elect (TCSS142)	TMATH 125 Calc 2 comp prereq (TCSS143)	TMATH 126 Calc 3 model elect. (TESC430)	
3rd year	TMATH324 Multivariable TMATH307 Dif Eq TMATH350 Jr. Seminar	TMATH402 Alg 1 stat. elect. (TMATH390)	TMATH403 Alg 2 W course	
4th year	geom. elect. (TMATH321) TMATH496 Internship	TMATH327 Real 1 TMATH 450 Capstone	cult. elect. (TCSS325)	

# Prerequisites



# Capstone Experience

- TMath 350 Jr. Seminar:
  - Prerequisite: Jr. status (open to non-majors)
  - Seminar-style
  - Introduces special math topics
  - Develops research, writing, & presenting skills
  - Introduces employment & career opportunities
- TMath 410 Capstone:
  - Prerequisite: TMath 350 & Instructor approval
  - Already have significant work done before 410
  - Focuses on writing, editing, and presenting individual or group project.