Proposed
Bachelor of Science in Mathematics

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School of Interdisciplinary Arts and Sciences, Sciences and Mathematics Division, UW Tacoma
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.
SLO Themes

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

EXTENDED CORE

Abstract Alg. 2 (TMath402)
Real Analysis 2 (TMath426)
Abstract Alg. 1 (TMath401)
Real Analysis 1 (TMath425)

CORE

Matrix (TMath308)
Proofs (TMath300)
Dir Eq (TMath307)
Multivar Calc. (TMath324)

Calculus 1 (TMath124)
Calculus 2 (TMath125)
Calculus 3 (TMath126)

ELECTIVES

Math in Culture
Computing
Modeling
Probability or Statistics
Topology or Geometry

CAPSTONE

Jr. Seminar (TMath350)
Capstone (TMath410)

CORE
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)
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

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

Topography
- TMath 420* Math History

Probability/Statistics
- TMath310 Stats for Environ. App
- TMath390 Prob & Stats in Engineering
- TURB225 Stats for Urban Analysis
- TSOCPF 351 Applied Stats for Soc. & Human Services

Modeling
- TESC 430 Environmental Modeling
- TESC 453 Env. Remote Sensing
- TESC 122 Electromagnetism & Oscillatory Motion
- TBUS 301 Quant. Analysis for Business

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:

<table>
<thead>
<tr>
<th>Year</th>
<th>Autumn</th>
<th>Winter</th>
<th>Spring</th>
<th>Summer</th>
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<tbody>
<tr>
<td>1st year</td>
<td>TMATH124 Calc 1 1st year Core</td>
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<td>2nd year</td>
<td>TMATH300 Reasoning  TMATH324 Multivariable</td>
<td>TMATH307 Dif Eq stat. elect. (TMATH390)</td>
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#### Mathematical Social Science focus:

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Pathway Examples

Math non-standard entry:

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STEM focus:

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Prerequisites

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Proofs (TMath300)
Dif Eq (TMath307)
Multivar Calc. (TMath324)

Discrete (TCSS321)
Calculus 1 (TMath124)
Calculus 2 (TMath125)
Calculus 3 (TMath126)

Abstract Alg. 1 (TMath402)
Real Analysis 1 (TMath424)
Abstract Alg. 2 (TMath403)
Real Analysis 2 (TMath425)

Jr. Seminar (TMath350)
Capstone (TMath410)

Computing
Math in Culture
Modeling
Probability or Statistics
Topology or Geometry

Real Analysis 1 (TMath300)
Proofs (TMath300)
Dif Eq (TMath307)
Multivar Calc. (TMath324)

Capstone (TMath410)

Discrete (TCSS321)
Calculus 1 (TMath124)
Calculus 2 (TMath125)
Calculus 3 (TMath126)
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.