

# MATHEMATICS MAJOR, BACHELOR OF SCIENCE (BS)

The program leading to a BS in Mathematics is rigorous, but flexible. All students enroll in the required core of mathematics and also choose electives in mathematics. Then, there is a choice of electives outside of mathematics that gives students a background in fields where mathematics is heavily used in industry and government. Therefore, this degree prepares students for a career in industry or government or for graduate study in mathematics or a closely related field.

**Prerequisite Grade Policy:** students must have earned a grade  $\geq C$  or better in any course that is to be used to satisfy a prerequisite requirement for a subsequent mathematics course offered by the Eastern Washington University Department of Mathematics.

**Grade Requirements:** students must receive a grade  $\geq C$  in each course used to satisfy the requirements of an undergraduate major or minor in mathematics.

## Required Courses

MATH/HONS 161	CALCULUS I	5
MATH 162	CALCULUS II	5
MATH 163	CALCULUS III	5
MATH 225	FOUNDATIONS OF MATHEMATICS	5
MATH 231	LINEAR ALGEBRA	5
MATH 241	CALCULUS IV	5
MATH 347	INTRODUCTORY DIFFERENTIAL EQUATIONS	4
MATH 385	PROBABILITY AND STATISTICAL INFERENCE I	5
MATH 432	RINGS AND POLYNOMIALS	5
MATH 443	NUMERICAL METHODS	5
MATH 460	CONTINUOUS FUNCTIONS	5

## Required Electives—choose from the following 35

A maximum of 20 credits of electives may be counted from outside the MATH Department. Some of these courses may require completion of additional prerequisites.

CHEM 421	PHYSICAL CHEMISTRY
CHEM 422	PHYSICAL CHEMISTRY
CHEM 423	PHYSICAL CHEMISTRY
CSCD 300	DATA STRUCTURES
CSCD 305	C++ PROGRAMMING
CSCD 320	ALGORITHMS
CSCD 340	OPERATING SYSTEMS
CSCD 420	COMPILERS
CSCD 480	INTELLIGENT SYSTEMS
CSCD 501	ADVANCED ALGORITHMS
ECON 337	ECONOMETRICS
ECON 430	MATHEMATICAL ECONOMICS
EENG 320	SIGNALS AND SYSTEMS I
EENG 321	SIGNALS AND SYSTEMS II
EENG 420	DIGITAL SIGNAL PROCESSING
EENG 440	DIGITAL COMMUNICATION SYSTEMS
EENG 470	CONTROL SYSTEMS
EENG 471	DIGITAL CONTROL SYSTEMS
MATH 331	DISCRETE MATHEMATICS WITH APPLICATIONS

MATH 332	NUMBER THEORY
MATH 350	BIOMATHEMATICS
MATH 430	ADVANCED LINEAR ALGEBRA
MATH 431	APPLIED GROUP THEORY
MATH 433	GALOIS THEORY
MATH 444	NUMERICAL LINEAR ALGEBRA
MATH 445	NUMERICAL ANALYSIS
MATH 447	DIFFERENTIAL EQUATIONS
MATH 448	PARTIAL DIFFERENTIAL EQUATIONS
MATH 461	ADVANCED CALCULUS I
MATH 462	ADVANCED CALCULUS II
MATH 470	FOUNDATIONS OF GEOMETRY
MATH 481	COMPLEX ANALYSIS
MATH 485	PROBABILITY AND STATISTICAL INFERENCE II
MATH 486	PROBABILITY AND STATISTICAL INFERENCE III
MENG 492	FINITE ELEMENT ANALYSIS
PHYS 361	CLASSICAL MECHANICS I
PHYS 362	CLASSICAL MECHANICS II
PHYS 363	RELATIVITY
PHYS 371	QUANTUM PHYSICS I: INTRODUCTION
PHYS 401	ELECTROMAGNETISM I
PHYS 402	ELECTROMAGNETISM II

## Required Senior Capstone/Thesis

MATH 491	SENIOR THESIS	5
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**Total Credits 94**

## Plan of Study

The following plan of study is for a student with zero credits. Individual students may have different factors such as: credit through transfer work, Advanced Placement, Running Start, or any other type of college-level coursework that requires an individual plan.

Courses could be offered in different terms, checking the academic schedule is paramount in keeping an individual plan current. **Students should connect with an advisor to ensure they are on track to graduate.**

All Undergraduate students are required to meet the Undergraduate Degree Requirements (<http://catalog.ewu.edu/undergraduate-degree/>).

### First Year

Fall Quarter	Credits	Winter Quarter	Credits	Spring Quarter	Credits
ENGL 101	5	ENGL 201	5	MATH 161	5
MATH 141	5	MATH 142	5	MATH 231	5
Humanities & Arts BACR 1 <sup>1</sup>	5	Social Science BACR 1 <sup>1</sup>	5	Natural Science BACR 1 <sup>1</sup>	5
	15		15		15

### Second Year

Fall Quarter	Credits	Winter Quarter	Credits	Spring Quarter	Credits
MATH 162	5	MATH 163	5	MATH 241	5
MATH 225	5	Mathematics Elective <sup>2</sup>	5	Mathematics Elective <sup>2</sup>	5
Humanities & Arts BACR 2 <sup>1</sup>	5	Social Science BACR 2 <sup>1</sup>	5	Natural Science BACR 2 <sup>1</sup>	5
	15		15		15

### Third Year

Fall Quarter	Credits	Winter Quarter	Credits	Spring Quarter	Credits
MATH 347	4	Diversity - graduation requirement <sup>1</sup>		MATH 443	5
MATH 385	5	Mathematics Elective <sup>2</sup>	5	Mathematics Elective <sup>2</sup>	5
Global Studies - graduation requirement <sup>1</sup>	5	Mathematics Elective <sup>2</sup>	5	Mathematics Elective <sup>2</sup>	5

Elective - certificate, minor, or general elective	1			
	15	15	15	15
<b>Fourth Year</b>				
<b>Fall Quarter</b>	<b>Credits</b>	<b>Winter Quarter</b>	<b>Credits</b>	<b>Spring Quarter</b>
Mathematics Elective <sup>2</sup>	5	MATH 460	5	MATH 432
Elective - certificate, minor, or general elective	5	Elective - certificate, minor, or general elective	5	MATH 491 (Senior Capstone - graduation requirement)
Elective - certificate, minor, or general elective	5	Elective - certificate, minor, or general elective	5	Elective - certificate, minor, or general elective
	15	15	15	15
<b>Total Credits 180</b>				

<sup>1</sup> University Graduation Requirements (UGR) and Breadth Area Course Requirements (BACR) courses may be less than 5 credits and additional credits may be required to reach the required 180 total credits needed to graduate. Students should connect with an advisor to ensure they are on track to graduate.

<sup>2</sup> Required Electives—choose 35 credits from the approved list. A maximum of 20 credits of electives from the approved list may be counted from outside the MATH Department.

### University Competencies and Proficiencies

English (<http://catalog.ewu.edu/undergraduate-degree/#newitemtext>)  
 Quantitative and Symbolic Reasoning (<http://catalog.ewu.edu/undergraduate-degree/#mathcompproficiencytext>)  
 Placement and Clearance (<http://catalog.ewu.edu/placement/>)  
 Prior Learning/Sources of Credit AP, CLEP, IB (<http://catalog.ewu.edu/prior-learning/>)

### General Education Requirements (<http://catalog.ewu.edu/undergraduate-degree/#generaleducationrequirements>) (GER)

- Minimum Credits—180 cumulative credit hours
  - 60 upper-division credits (300 level or above)
  - 45 credits in residence (attendance) at Eastern, with at least 15 upper-division credits in major in residence at Eastern
- Minimum Cumulative GPA  $\geq 2.0$

### Breadth Area Core Requirements (BACR)

Humanities and Arts (<http://catalog.ewu.edu/undergraduate-degree/#humanitiesandfineartsgecrtext>)  
 Natural Sciences (<http://catalog.ewu.edu/undergraduate-degree/#naturalsciencesgecrtext>)  
 Social Sciences (<http://catalog.ewu.edu/undergraduate-degree/#socialsciencesgecrtext>)

### University Graduation Requirements (<http://catalog.ewu.edu/undergraduate-degree/#universitygraduationrequirements>) (UGR)

Diversity Course List (<http://catalog.ewu.edu/undergraduate-degree/#cultureandgenderdiversityintheuslisttext>)  
 World Language (<http://catalog.ewu.edu/undergraduate-degree/#worldlanguagetext>) (for Bachelor of Arts)  
 Global Studies Course List (<http://catalog.ewu.edu/undergraduate-degree/#internationalstudiesrequirementtext>)

Minor or Certificate (<http://catalog.ewu.edu/undergraduate-degree/#majorminororcertificateugrtext>)  
 Senior Capstone Course List (<http://catalog.ewu.edu/undergraduate-degree/#capstonecourselisttext>)

Application for Graduation (use EagleNET (<https://inside.ewu.edu/eaglenet/>)) must be made at least two terms in advance of the term you expect to graduate (undergraduate and post-baccalaureate).

Use the Catalog Archives (<http://catalog.ewu.edu/archives/>) to determine *two important catalog years*.

Requirements in Degree Works (<https://inside.ewu.edu/records-and-registration/degree-works/>) are based on these two catalog years:

- The catalog *in effect at the student's first term* of current matriculation is used to determine **BACR** (Breadth Area Credit Requirements) **and** **UGR** (Undergraduate Graduation Requirements).
- The catalog *in effect at the time the student declares a major or minor* is used to determine the program requirements.

### Students who earn a BS in Mathematics from EWU should be able to:

- communicate mathematical concepts both technically and non-technically;
- create and understand mathematical arguments and proofs;
- discuss mathematical applications in industry and the sciences;
- perform analysis with numerical and symbolic mathematical technology/software.