The comprehensive emphasis is the "classical" math major; its emphasis is on theoretical courses that prepare a student to understand contemporary work in mathematics. Comprehensive emphasis courses are largely theoretical and proof-intensive, providing students with background, tools, and techniques they will need to pursue advanced study in mathematics. In particular, this emphasis prepares students for graduate study in mathematics, applied mathematics, and most scientific fields.

**Undergraduate Graduation Requirements**

All course work and requirements for this degree must be completed prior to the date the degree is awarded. The University of Arizona requirements to follow in this audit are required for graduation and awarding of the degree.

Curriculum:
1. The University of Arizona and the Arizona Board of Regents have sole discretion over all curricula changes.
2. Courses, programs & requirements may be suspended, deleted, restricted, or changed in any manner, at any time.
3. Students must remain currently informed about all policies & other info that bears on completing a degree.

Required Units:
Additional units will be required to complete this degree if a student:
A) is admitted to the UA with deficiencies;
B) changes their academic plan(s);
C) fails to meet minimum course/plan requirements;
D) ineffectively plans or fails to execute a course of study that leads directly to degree completion; or
E) Candidates for a second bachelor's degree at The University of Arizona with a different award date than the first must earn no fewer than 30 units of University Credit in addition to the units required for the first degree, and must meet all requirements for the second degree.

The following requirements must be met for graduation.

**Units Required and Cumulative GPA**

120 units are required at a 2.0 GPA. View the pdf report grid for units earned toward this degree and cumulative GPA.

Completing a second bachelor's degree at The University of Arizona requires no fewer than 30 units in addition to the units required for the first degree, and all requirements for the second degree must be met.

**Upper Division Units**

- Not Satisfied: A minimum of 42 units of upper-division credit are required for this degree.
  - Units: 42.00 required, 0.00 completed, 42.00 needed

**Units in Residence**

- Not Satisfied: A minimum of 30 units in residence at The University of Arizona (excluding correspondence credit and credit by exam) is required.
  - Units: 30.00 required, 0.00 completed, 30.00 needed

**Final Units in Residence**

A minimum of 18 of the final 30 units taken toward degree requirements must be in residence at The University of Arizona.
Consult with your academic advisor if you plan to use transfer credits to fulfill your degree requirements.

**Correspondence and/or Exam Credit Limit**

(R2075/L10)
**Satisfied:** A maximum of 60 units of Correspondence Credit and/or Exam Credit may apply toward graduation.

- **Units:** 0.00 completed

**Non Degree Seeking Limit**

A maximum of 15 units completed as a non-degree seeking student may be used for fulfilling undergraduate degree requirements. Units exceeding this limit (shown below) must be subtracted from the units required towards the degree and graduation requirements.

**Non-Community College Units**

**Not Satisfied:** Non-Community College Units: While there is no limit to the total number of units of course work that may be transferred from an accredited community college to The University of Arizona, no more than 64 units from a 2-year institution may be applied toward the requirements for a bachelor's degree. Therefore, to reach the required 120 units for a bachelor's degree, a minimum of 56 units must be completed from 1) coursework at a 4-year institution, 2) approved credit by examination (refer to UA Catalog for approved examinations and scores), or 3) any combination thereof.

- **Units:** 56.00 required, 0.00 completed, 56.00 needed

**Success Course Limit**

**Satisfied:** No more than 3 units will apply toward a student's graduation requirements. All Success courses taken can be seen below. Success Course units exceeding the 3 unit maximum must be subtracted from the total units, residency requirements and cumulative grade point average.

**PE Activity Course Limit**

**Satisfied:** No more than 3 units will apply toward a student's graduation requirements. All PE activity courses taken can be seen below. PE Activity units exceeding the 3 unit maximum must be subtracted from the total units, residency requirements and cumulative grade point average.

**Foundation Mathematics**

**Not Satisfied:** Foundation Mathematics

**GE Substantial Math Strand**

**Not Satisfied:** Complete 1 course.

**GE Substantial Math Strand**

**Not Satisfied:** Complete 1 course.

- **Units:** 2.67 required, 0.00 completed, 2.67 needed

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Courses Available

MATH 122B, MATH 125, MATH 129, MATH 215, MATH 223, MATH 254, MATH 313

Undergraduate General Education and Foundation Requirements

Overall Requirement Not Satisfied: Undergraduate General Education and Foundation Requirements

Foundation Composition

Not Satisfied: Complete 1 of the following 4 Foundation Composition options:
1. 3 Course Foundation Composition Sequence
2. 2 course Foundation Composition sequence
3. Honors Composition with grade of C or higher
4. Honors Composition with a grade of D and Second Semester Composition.

Please note: Students who earn a grade of D in Honors Composition may choose to repeat the course in order to earn a higher grade to satisfy the requirement. Please consult with your major advisor.

Mid-Career Writing Assessment - Complete 2nd semester English Composition with a B grade or higher. Students who do not earn a grade of B or better in 2nd semester English Composition must also satisfy a college or department writing requirement. Consult your major advisor if you do not earn a grade of B in 2nd semester English Composition.

Option 1: Foundation Composition - 3 Course Sequence


- Courses: 3.00 required, 0.00 completed, 3.00 needed

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Courses Available

ENGL 101, ENGL 101A, ENGL 107, ENGL 107A, (***) (###), ENGL 102, ENGL 108, ENGL 106

OR Option 2: Foundation Composition - 2 Course Sequence

Not Satisfied: Complete 2 courses. Complete ENGL 101/107 AND ENGL 102/108

- Courses: 2.00 required, 0.00 completed, 2.00 needed

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Courses Available

ENGL 101, ENGL 101A, ENGL 107, ENGL 107A, (***) (###), ENGL 102, ENGL 108

OR Option 3: Honors Composition

Not Satisfied: Complete 1 course with a C or better.

- Courses: 1.00 required, 0.00 completed, 1.00 needed

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**Courses Available**

ENGL 109H

**Foundation Second Language - Second Semester Proficiency**

*Not Satisfied:* Credit will not be given for a course at an equivalent or lower level than prior language credit earned. Course must be taken for a grade, not as pass/fail. Third semester or higher courses used to fulfill this requirement may also be used to fulfill other requirements. A grade of C or higher is required in the course that satisfies the second language requirement.

Demonstrate second semester proficiency in a second language by completing a sequence of courses through a second semester or higher level or by passing a language proficiency examination at the second semester level or higher.

**Second Semester Language Course**

*Not Satisfied:* Complete 1 course with a grade of C or better.


- **Courses:** 1.00 required, 0.00 completed, 1.00 needed

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**Courses Available**

AIS 104B, AIS 307B, ARB 102, CHN 102, CRL 102, FREN 102, FREN 112, GER 102, GRK 102, GRK 104, GRK 112, ITAL 102, ITAL 102Z, JPN 102, JUS 103B, KOR 102, LAS 305A, LAT 102, LAT 112, LING 104B, LING 307B, MENA 103B, PORT 102, PORT 305A, PORT 325A, PRS 102, RSSS 102, SERP 370B, SPAN 102, SPAN 103, SPAN 205, TURK 102

**General Education Tier I**

*Overall Requirement Not Satisfied:* Complete each of the following areas.

**Tier I Individuals & Societies/150s**

*Not Satisfied:* Complete 2 courses, 6 units total. Transfer students with quarter system credits may satisfy Tier One requirements with 2 courses and 5.34 units.

- **Units:** 5.34 required, 0.00 completed, 5.34 needed
- **Courses:** 2.00 required, 0.00 completed, 2.00 needed

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**Courses Available**

(***)(###), AFAS 150B1, ANTH 150B1, ART 150B1, ART 150B2, EAS 150B1, EDP 150B1, ENGL 150B1, ESOC 150B1, FREN 150B1, FSHD 150B1, FTV 150B1, GEOG 150B1, GEOG 150B2, GER 150B1, GWS 150B1, GWS 150B2, GWS 150B3, GWS 150B4, GWS 150B5, HNRS 150B1, HNRS 150B2, HUMS 150B1, ITAL 150B1, LAR 150B1, LAS 150B1,
MAS 150B1, MAS 150B2, MIS 150B1, PA 150B1, PHIL 150B1, POL 150B1, RCSC 150B1, RCSC 150B2, RELI 150B1, RSSS 150B1, RSSS 150B2, SOC 150B1, SOC 150B2, SPAN 150B1, SPAN 150B2, TLS 150B1, AED 150A1, ANTH 150A1, ART 150A1, GER 150A1, HWRS 150A1, LING 150A1, MIS 150A1, PAH 150A1, PAH 150A2, PHIL 150A1, POL 150A1, PSY 150A1, AED 150C1, AREC 150C1, AREC 150C2, AREC 150C3, ECON 150C1, FIN 150C1, GEOG 150C1, HIST 150C1, HIST 150C2, HIST 150C3, HIST 150C4, HIST 150C5, HIST 150C6, HRNR 150C1, JOUR 150C1, LAS 150B2, MAS 150C1, MENA 150C1, NSC 150C1, PHIL 150C1, PLP 150C1, POL 150C1, POL 150C2, POL 150C3, RNR 150C1, SOC 150C1, SOC 150C2, TLS 150C1

Tier I Traditions & Cultures/160s

Not Satisfied: Complete 2 courses, 6 units total. Transfer students with quarter system credits may satisfy Tier One requirements with 2 courses and 5.34 units.

- Units: 5.34 required, 0.00 completed, 5.34 needed
- Courses: 2.00 required, 0.00 completed, 2.00 needed

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Courses Available


General Education Tier II

Overall Requirement Not Satisfied: Complete each of the following areas.

Tier II Arts

Not Satisfied: Complete 1 course, 3 units total. Transfer students with quarter system credits may satisfy Tier Two requirements with 2.67 units.

- Units: 2.67 required, 0.00 completed, 2.67 needed
- Courses: 1.00 required, 0.00 completed, 1.00 needed

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Courses Available


Tier II Humanities

Not Satisfied: Complete 1 course, 3 units total. Transfer students with quarter system credits may satisfy Tier Two requirements with 2.67 units. Prerequisite course work in Tier 1 Traditions and Cultures (TRAD) must be completed prior to taking. If LAT 201 or 202 are used to fulfill Foundation Second Language Proficiency, they cannot be used to fulfill Tier II Humanities.
- **Units**: 2.67 required, 0.00 completed, 2.67 needed

- **Courses**: 1.00 required, 0.00 completed, 1.00 needed

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Courses Available


Tier II Individual & Societies

Not Satisfied: Complete 1 course, 3 units total. Transfer students with quarter system credits may satisfy Tier Two requirements with 2.67 units. Prerequisite course work in Tier 1 Individuals and Societies (INDV) must be completed prior to taking.

- **Units**: 2.67 required, 0.00 completed, 2.67 needed

- **Courses**: 1.00 required, 0.00 completed, 1.00 needed

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Courses Available


(R528/L30)
Diversity Emphasis Course

**Not Satisfied:** One course must be taken that focuses on Gender, Race, Class, Ethnicity, Sexual Orientation or Non-Western Area Studies.

Courses used to fulfill this requirement may also be used to fulfill other requirements.

Diversity Emphasis Course

**Not Satisfied:** General Education Diversity Emphasis Course: Gender, Race, Class, Ethnicity, Sexual Orientation or Non-Western Area Studies.

- **Courses:** 1.00 required, 0.00 completed, 1.00 needed

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Courses Available


Additional Coursework

Courses listed in this section may include general elective credits, UA courses and transferable courses from other institutions. Consult with your advisor to determine if courses listed in this section may be used to fulfill a requirement or sub-requirement in your degree program.

Courses taken for Pass/Fail option can only count as elective credit. They cannot fulfill any General Education, Major, or Minor requirements.

BS in Mathematics

**Overall Requirement Not Satisfied:** Will appear fully satisfied when student satisfies Mathematics Supporting Laboratory Science Sequence, Mathematics Application Courses, Mathematics Computer Science, Math Major Core Requirements, and selects an emphasis. All emphases require a minimum of 15 units of 400-level coursework in the major.
The Bachelor of Science in Mathematics requires the same Core Mathematics courses as the BA; BS students must satisfy specialized supporting laboratory science and application course requirements instead of general education courses in Natural Science.

Equivalent MATV courses may be available through UA South. For approved courses consult with your advisor.

**Mathematics Supporting Laboratory Science Sequence**

Not Satisfied: Will appear fully satisfied when student has satisfied one of the approved sequences of laboratory science courses.

BS students must complete a two-semester sequence in a laboratory science: choose from Chemistry, Physics, Biology, Physiology, or Geosciences.

Courses used to fulfill this requirement may also be used to fulfill other requirements.

**Option 1: Chemistry I**

Not Satisfied: Complete 4 units from Chemistry 141 & 143, 151, 161 & 163

- **Units:** 4.00 required, 0.00 completed, 4.00 needed

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Courses Available

CHEM 141, CHEM 143, CHEM 151, CHEM 161, CHEM 163, Approved Transfer Course

AND **Option 1: Chemistry II**

Not Satisfied: Complete 4 units from Chemistry 142 & 144, 152, 162 & 164

- **Units:** 4.00 required, 0.00 completed, 4.00 needed

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Courses Available

CHEM 142, CHEM 144, CHEM 152, CHEM 162, CHEM 164, Approved Transfer Course

OR **Option 2: Geosciences**

Not Satisfied: Complete 1 course

- **Courses:** 1.00 required, 0.00 completed, 1.00 needed

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Courses Available

GEOS 251
AND Option 2: Geosciences
Not Satisfied: Complete 1 course
- Courses: 1.00 required, 0.00 completed, 1.00 needed

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Courses Available
- GEOS 302, GEOS 304, GEOS 308, GEOS 322

OR Option 3: Biology
Not Satisfied: OR Complete 8 units
- Units: 8.00 required, 0.00 completed, 8.00 needed

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Courses Available
- MCB 181L, MCB 181R, Approved Transfer Course, MCB 184, ECOL 182L, ECOL 182R

OR Option 4: Physiology
Not Satisfied: Complete 2 courses
- Courses: 2.00 required, 0.00 completed, 2.00 needed

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- PSIO 201
- PSIO 202

Courses Available
- PSIO 201, PSIO 202

OR Option 5: Introductory Mechanics
Not Satisfied: OR Complete one course from Physics 141, 161H.
- Courses: 1.00 required, 0.00 completed, 1.00 needed

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Courses Available
PHYS 141, PHYS 161H

AND Option 5: Intro Thermodynamics & Optics or Electricity & Magnetism

Not Satisfied: AND Complete 1 course from Physics 142, 241, 162H, 261H.

- Courses: 1.00 required, 0.00 completed, 1.00 needed

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Courses Available
PHYS 142, PHYS 162H, PHYS 241, PHYS 261H

Mathematics Application Courses

Not Satisfied: Will appear fully satisfied when student has satisfied 6 units of non-math coursework with a prerequisite or corequisite of at least Calculus I (MATH 122B or higher).

Courses used to fulfill this requirement may also be used to fulfill other requirements.

This requirement does not apply to the Mathematics Education Emphasis.

Courses with Calculus Prerequisite

Not Satisfied: Consult with the advisor to discuss approved courses.

- Units: 6.00 required, 0.00 completed, 6.00 needed

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Courses Available

Mathematics Supporting Computer Science

Satisfied: Will appear fully satisfied when student satisfies Computer Science requirements.

Computer Science

Not Satisfied: Complete 1 course. Consult your advisor for a list of alternative programming courses.

Courses used to fulfill this requirement may also be used to fulfill other requirements.

- Courses: 1.00 required, 0.00 completed, 1.00 needed

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Courses Available

CSC 110, ISTA 130

Math Major Core Requirements

Overall Requirement Not Satisfied: Will appear fully satisfied when student satisfies Calculus I and other Core Courses.

Calculus I

Not Satisfied: Complete 1 course

- Courses: 1.00 required, 0.00 completed, 1.00 needed

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Courses Available

MATH 122B, MATH 125

Core Courses

Not Satisfied: Complete 5 courses. Credit allowed for only one course in each pair: MATH 313 or MATV 313, MATH 323 or MATV 323, MATH 355 or MATV 355. MATV courses are only available to UA South students.

- Courses: 5.00 required, 0.00 completed, 5.00 needed

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<tr>
<th>Term</th>
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<th>Units</th>
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Courses Available

MATH 129, MATH 223, MATH 313, MATH 323, MATH 355, MATV 313, MATV 323, MATV 355

Emphasis in Comprehensive Mathematics


Equivalent MATV courses may be available through UA South. For approved courses consult with your advisor.

Comprehensive Emphasis Requirements

Overall Requirement Not Satisfied: Will appear fully satisfied when student satisfies Comprehensive Required Courses and either the sequence in Abstract Algebra or Differential Equations.

Comprehensive Required Courses

Not Satisfied: Complete 4 courses

- Courses: 4.00 required, 0.00 completed, 4.00 needed
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**Courses Available**

MATH 413, MATH 424, MATH 425A, MATH 425B

Option 1: Abstract Algebra

*Not Satisfied:* Complete MATH 415A and MATH 415B

- **Courses:** 2.00 required, 0.00 completed, 2.00 needed

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**Courses Available**

MATH 415A, MATH 415B

OR Option 2: Differential Equations

*Not Satisfied:* OR Complete MATH 454 and MATH 456

- **Courses:** 2.00 required, 0.00 completed, 2.00 needed

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**Courses Available**

MATH 454, MATH 456

Major 400-level Upper Division

*Not Satisfied:* A minimum of 15 units of 400-level upper-division major coursework must be completed.

- **Units:** 15.00 required, 0.00 completed, 15.00 needed
Comprehensive Math Emphasis Graduation Requirements

**Overall Requirement Not Satisfied:** Will appear fully satisfied when student satisfies Mid Career Writing Assessment, Major GPA, Residency requirement, and Major Upper Division unit requirement.

**Mid Career Writing Assessment**
- **Not Satisfied:** Complete 2nd semester English Composition with a B grade or higher. Students who do not earn a grade of B or higher in 2nd semester English Composition must also satisfy a college or department writing requirement. Consult your major advisor if you do not earn a grade of B or higher in 2nd semester English Composition.
  - **Courses:** 1.00 required, 0.00 completed, 1.00 needed

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**Major GPA**
- **Satisfied:** A minimum 2.0 GPA is required in the major coursework.
  - **GPA:** 2.000 required, 0.000 completed

**Major Units**
- **Not Satisfied:** A minimum of 37 units must be completed in the major.
  - **Units:** 37.00 required, 0.00 completed, 37.00 needed

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**Major Residency**
- **Not Satisfied:** A minimum of 18 units in the major must be taken at the University of Arizona.
  - **Units:** 18.00 required, 0.00 completed, 18.00 needed

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Major Upper Division

Not Satisfied: A minimum of 21 units of upper-division major coursework must be completed.

- Units: 21.00 required, 0.00 completed, 21.00 needed

Minor Required

Not Satisfied: A minor outside of the Mathematics Department is required for this major. Consult with your advisor to select a minor or discuss other options such as selecting a second major.