Undergraduate Career
College of Science Program
Mathematics Major (BA)
Computer Science Emphasis
Requirement Term: Fall 2019

MAIN Campus at TUCSON Location

This emphasis is for students interested in applications of computers to mathematical problems, and of mathematics to computer science. It is a good choice for math majors who plan to attend graduate school in computer science or work in jobs related to computation. A minor or second major in Computer Science is required.

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
Satisfied: A maximum of 60 units of Correspondence Credit and/or Exam Credit may apply toward graduation.
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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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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<th>Courses Available</th>
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<tr>
<td>ENGL 101, ENGL 101A, ENGL 107, ENGL 107A, (***) (###), ENGL 102, ENGL 108, ENGL 106</td>
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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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<tr>
<td>ENGL 101, ENGL 101A, ENGL 107, ENGL 107A, (***) (###), ENGL 102, ENGL 108</td>
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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
Courses Available

ENGL 109H

Foundation Second Language - Fourth 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 for pass/fail.

Demonstrate fourth semester proficiency in a second language by completing one of the following:

1. Complete a Fourth Semester Language Course with a grade of C or higher.
2. Complete Arabic 401 and 1 course with a grade of C of higher from Arabic 424B, 427B or 430B.
3. Pass a language proficiency examination at the fourth semester level

Option 1: Fourth Semester Language Course

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


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

· Courses: 1.00 required, 0.00 completed, 1.00 needed

Courses Available


OR Option 2: Arabic Language

Not Satisfied: Complete ARB 401, Intermediate Arabic, plus one additional course from ARB 424B, 427B, 439B, 484B.

· Courses: 1.00 required, 0.00 completed, 1.00 needed

Courses Available

ARB 401

AND Option 2: Additional Arabic Courses

Not Satisfied: Complete one additional course with a grade of C or better from ARB 424B, 427B, 439B, 484B.

· Courses: 1.00 required, 0.00 completed, 1.00 needed
### 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

### Courses Available

ARB 424B, ARB 427B, ARB 439B, ARB 484B

#### Tier I Natural Sciences/170s

**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

### Courses Available

(***)(###), AFAS 150B1, ANTH 150B1, ART 150B1, ART 150B2, EAS 150B1, EDP 150B1, ENGL 150B1, ESOC 150B1, FREN 150B1, FSHD 150B1, FTW 150B1, GEOG 150B1, GEG 150B2, GER 150B1, GWS 150B1, GWS 150B2, GW 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, HNRS 150A1, LING 150A1, MIS 150A1, PAH 150A1, PAH 150A2, PAH 150A3, PHIL 150A1, POL 150A1, PSY 150A1, AED 150C1, ANTH 150C1, AREC 150C1, AREC 150C2, AREC 150C3, CLAS 150C1, ECON 150C1, FIN 150C1, FREN 150C1, GEOG 150C1, HIST 150C1, HIST 150C2, HIST 150C3, HIST 150C4, HIST 150C5, HIST 150C6, HNRS 150C1, HPS 150C1, ITAL 150C1, JOUR 150C1, LAS 150B2, LING 150C1, MAS 150C1, MENA 150C1, NSC 150C1, PHIL 150C1, PLP 150C1, POL 150C1, POL 150C2, POL 150C3, PPEL 150C1, RNR 150C1, SOC 150C1, SOC 150C2, TLS 150C1, PHIL 150D1

#### Physical Sciences

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

### Courses Available

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### 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

### Courses Available

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### 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
## Tier II Individual & Societies

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**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

## Tier II Natural Sciences

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**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 (NATS) 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


### 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
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.

BA in Mathematics
Overall Requirement Not Satisfied: Will appear fully satisfied when student satisfies Mathematics Supporting 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.

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

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 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 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
### 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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### Courses Available

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

### Emphasis in Computer Science Mathematics

Overall Requirement Not Satisfied: Will appear fully satisfied when student satisfies Computer Science Emphasis course requirements, Graduation Requirements, and declares a minor in Computer Science.

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

### Computer Science Emphasis Requirements

Overall Requirement Not Satisfied: Will appear fully satisfied when student satisfies one of the sequences listed below, two of the electives, and one advisor approved course.

**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: Probability and Statistics**

Not Satisfied: OR Complete MATH 464 and MATH 466

- Courses: 2.00 required, 0.00 completed, 2.00 needed

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### Courses Available

MATH 464, MATH 466
Courses Available

MATH 464, MATH 466

OR Option 3: Numerical Analysis

Not Satisfied: OR Complete MATH 475A and MATH 457B

- Courses: 2.00 required, 0.00 completed, 2.00 needed

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Courses Available

MATH 475A, MATH 475B

Electives

Not Satisfied: Complete 2 courses

- Courses: 2.00 required, 0.00 completed, 2.00 needed

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Courses Available

CSC 473, MATH 413, MATH 443, MATH 445, MATH 446, MATH 447

Advisor Approved Course

Not Satisfied: Complete one 400-level MATH course in consultation with your math faculty advisor. You may choose from the pre-approved list. If you prefer to select another course, you may do so ONLY if approved by your math faculty advisor.

- Units: 3.00 required, 0.00 completed, 3.00 needed

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Courses Available

CSC 401A, CSC 401B, CSC 473, DATA 468, MATH 401A, MATH 401B, MATH 402, MATH 413, MATH 415A, MATH 443, MATH 445, MATH 446, MATH 447, MATH 464, MATH 468, MATH 475A, MATH 485, PHIL 401A, PHIL 401B

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

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## Computer Science 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

### 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 34 units must be completed in the major.

- **Units:** 34.00 required, 0.00 completed, 34.00 needed

### 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 18 units of upper-division major coursework must be completed.

Units: 18.00 required, 0.00 completed, 18.00 needed

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Minor Required

Not Satisfied: A minor is required for this major.

You must complete 1 of the following:
- Computer Science Minor
- Computer Science Major
- Computer Science Major (Secondary)