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# Bachelor of Science Specialization



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Four-year programs, comprising a minimum of 120 units, provide education to a professional level and lead to the degree of BSc with Specialization.

Specialization programs are available in the Departments of Biochemistry, Biological Sciences, Cell Biology, Chemistry, Computing Science, Earth and Atmospheric Sciences, Mathematical and Statistical Sciences, Pharmacology, Physics, and Psychology.

A five-year (150 units) BEd/BSc (Specialization in Science and Education) program with majors and minors in Biological, Mathematical, and Physical Sciences is also available (see [BSc Honors and BSc Specialization](#) and [BSc \(Specialization in Science and Education\)/BEd \(Secondary\) Combined Degrees Program \[Science\]](#)).

## Admission

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See [BSc Honors and BSc Specialization Admission Requirements](#) for admission requirements.

## Selection of Courses

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**Note:** For success in your chosen program, ensure you have satisfied the pre/corequisite requirements for all courses. Departments have the right to remove students from courses for failing to present a passing grade (or higher, where stipulated) in the prerequisite course(s) and/or for failing to be enrolled in the corequisite course(s). Please see the [Faculty of Science Programs website](#) for more information.

The following regulations govern Specialization programs:

1. In each year, a Specialization student's program must be approved by a Specialization advisor in the appropriate Department and by the Faculty Office.
2. A minimum of 72 units in Science is required in most Specialization programs. Certain Departments may require more than 72 units. BSc Specialization in Planning requires a minimum of 66 units in Science.
3. A student must take at least 18 units in Arts courses as part of the requirements for most Specialization

degrees.

4. Normally, no more than 42 units in junior courses are permitted in Specialization programs.
5. Certain non-Arts and non-Science courses appropriate to the program may be permitted in Specialization programs with the prior written approval of the Department directing the student's program.

Applicants to the BSc Specialization program who have taken non-Arts and non-Science courses before application will have the potential transfer credit for such courses assessed at the time of admission to the program.

## Course Load Requirements

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To graduate in four years normally requires that BSc Specialization students take the usual full course load of 30 units in each Fall/Winter of the program. Students who wish to extend their programs are still expected to

complete at least 24 units in each Fall/Winter of the program. Exceptions to course load requirements must be approved in advance each year by the Department and the Faculty Office. (See Time Limits for Completion of Program below.)

## Academic Standing and Graduation

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The following regulations govern Specialization programs:

1. Continuation in a Specialization program is by recommendation of the Department concerned and requires a GPA of at least 2.3 in each of the preceding Fall/Winter periods. See description of Specialization programs of individual departments for additional requirements relating to promotion in the Specialization program. Students must be in good standing (i.e., meet the continuation requirements) in the Specialization program in order to graduate.
2. A student who fails to attain the standard necessary for continuation in the Specialization program will be required to withdraw from that program. In so doing, the student may apply to transfer to the General program in the Faculty. Students applying to transfer from a Specialization to the General program must

meet the continuation GPA of 2.0.

3. A student who fails to complete the requirements for a Specialization degree in the fourth year may be granted the General degree forthwith on application if the courses taken and the standing attained are satisfactory. Such students must apply to transfer to the General program.
4. For graduation, a program of at least 120 units credited to the degree.
5. BSc Specialization degrees With Distinction are awarded when students obtain a GPA of at least 3.5 and no failing grades on the last 60 units, excluding courses declared extra-to-degree. If determination of the last 60 units requires consideration of one or more courses from a given term then all work from that term is included in the calculation for the purposes of qualifying for With Distinction. Normally, only U or A courses will be used in the calculation of the GPA for the last 60 units of the program.

## Residence Requirement

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A student transferring to the Faculty of Science with advanced standing must complete at least 60 units applicable to the BSc program while registered at the University of Alberta. Normally, at least 30 of the last 60 units must be completed while registered in the Faculty of Science.

## Time Limits for Completion of Program

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All BSc Specialization programs are designed to be four-year programs. However, in some cases the minimum course load requirements have been reduced to allow students the flexibility to complete the degree over a longer time period. Students wishing to extend their programs beyond the time frame dictated by the minimum course load requirement for their program must first obtain the written approval of the Department and the Associate Dean, Undergraduate or designate.

## BSc Specialization Requirements

- [Specialization in Biochemistry](#)
- [Specialization in Biological Sciences](#)
- [Specialization in Ecology, Evolution and Environmental Biology](#)
- [Specialization in Integrative Physiology](#)
- [Specialization in Molecular, Cellular and Developmental Biology](#)
- [Specialization in Cell Biology](#)
- [Specialization in Chemistry](#)
- [Specialization in Computing Science](#)
- [Specialization in Computing Science—Minor in Business](#)
- [Computing Science Specialization in Software Practice](#)
- [BSc Specialization in Computing Science After an Undergraduate Degree \(other than a BSc from the Faculty of Science at the University of Alberta\)](#)
- [Specialization in Atmospheric Sciences](#)
- [Specialization in Environmental Earth Sciences](#)
- [Specialization in Geology](#)
- [Specialization in Planning](#)
- [Specialization in Immunology and Infection](#)
- [Specialization in Mathematics](#)

## Specialization in Mathematics [Science]

Continuation in the Specialization in Mathematics program requires successful completion of at least 24 units with a minimum 2.3 GPA and a minimum 2.3 GPA on all MATH courses completed in the previous Fall/Winter. In addition, graduation requires a minimum 2.3 GPA on all courses credited towards the degree and a minimum 2.3 GPA on all MATH courses credited towards the degree.

The program must contain the following courses. It is recommended that these courses be taken in the years indicated.

## Year 1

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- [CMPUT 174 - Introduction to the Foundations of Computation I](#)
- [CMPUT 175 - Introduction to the Foundations of Computation II](#)
- 6 units in junior ENGL **OR** 3 units in junior ENGL and 3 units in junior WRS

## 6 units from

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- [MATH 114 - Elementary Calculus I](#)
- [MATH 115 - Elementary Calculus II](#)
- [MATH 117 - Honors Calculus I](#)
- [MATH 118 - Honors Calculus II](#)
- [MATH 134 - Calculus for the Life Sciences I](#)
- [MATH 136 - Calculus for the Life Sciences II](#)
- [MATH 144 - Calculus for the Physical Sciences I](#)
- [MATH 146 - Calculus for the Physical Sciences II](#)
- [MATH 154 - Calculus for Business and Economics I](#)
- [MATH 156 - Calculus for Business and Economics II](#)

## 3 units from

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- [MATH 125 - Linear Algebra I](#)
- [MATH 127 - Honors Linear Algebra I](#)

## Options

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- 3 units in an approved Science option (see [details of courses](#))
- 6 units in approved options

## Year 2

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- [MATH 216 - Introduction to Analysis](#) (see Note 3)
- [MATH 228 - Algebra: Introduction to Ring Theory](#)

## 6 units from

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- [MATH 214 - Intermediate Calculus III](#)
- [MATH 215 - Intermediate Calculus IV](#)
- [MATH 217 - Honors Advanced Calculus I](#)
- [MATH 317 - Honors Advanced Calculus II](#)

## 3 units from

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- [MATH 225 - Linear Algebra II](#)
- [MATH 227 - Honors Linear Algebra II](#)

## Options

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- 3 units in an approved Science option (see [details of courses](#))
- 6 units in approved Arts options
- 6 units in approved options



## Year 3

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- 12 units in approved MATH or MA PH options
- 6 units in approved Science options (see [details of courses](#))
- 6 units in approved Arts options
- 6 units in approved options

## Year 4

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- 12 units in approved MATH or MA PH options at the 300-level or higher, at least 3 units of which must be at the 400- level
- 6 units in approved Science options (see [details of courses](#))
- 12 units in approved options

## Notes

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1. Each student's program must have the approval of the Department of Mathematical and Statistical Sciences.
2. Students are encouraged to take at least 6 units in MATH in each Fall/Winter of the program.
3. Students presenting [MATH 118](#) must substitute a senior MATH option for [MATH 216](#).
4. Credit will not be given for [ECON 299](#), [ECON 386](#) or [ECON 387](#).
5. Credit in SCI 100 will be considered equivalent to [MATH 114](#), [MATH 115](#), [CMPUT 174](#) and 18 units in Science options (see [details of courses](#)).
6. Credit in [SCI 151](#) will be considered equivalent to 6 units in Science options.

- [Specialization in Mathematics - Computational Science](#)
- [Specialization in Mathematics and Economics](#)
- [Specialization in Mathematics and Finance](#)
- [Specialization in Statistics](#)
- [Specialization in Paleontology](#)
- [Specialization in Pharmacology](#)
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Office of the Registrar

University of Alberta

Administration Building, University of Alberta

Edmonton, Alberta, Canada T6G 2M7



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