APPLIED STATISTICS - BACHELOR OF SCIENCE

Overview

Every minute of every day data is generated at a staggering rate. That "big data" has the potential to do many things—reveal business trends, prevent diseases, improve safety and fight crime. The power of data lies not in the bits and bytes themselves, but in what you do with them. When you major in Applied Statistics, you analyze and explore a wide range of data and use statistics to find patterns, trends and connections that support strategic decisions. You gain a strong theoretical foundation in mathematics and computer science while focusing on the practical application of statistics that can be used in almost every industry and sector, including government, oil and gas, insurance, finance and medical and biological research.

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Bachelor of Science

Faculty of Arts and Science
MacEwan.ca/Science (http://MacEwan.ca/Science/)

The Bachelor of Science (BSc) is a foundational general degree that provides broad and widely applicable knowledge and abilities rather than a niche specialization. This broad base equips graduates with generalist knowledge and skills that give the flexibility and agility so highly valued in a dynamic world economy. It also offers students a solid foundation to specialize in future employment or further schooling.

The degree provides a breadth of study across various Arts and Science disciplines and sets the foundation for later years. The major and minor areas of study allow students to focus and gain in-depth expertise in complementary or entirely disparate disciplines; there is a wide array of possible combinations. Finally, options enable students to explore courses outside their disciplines or even within their program, enhancing their diversity of learning. The small classes, close interaction between instructors and students, opportunities for individual study, and faculty with a strong focus on teaching are signature strengths of this program.

General Program Information

The BSc requires students to complete 120 credits of non-duplicative coursework. The BSc emphasizes breadth and depth and has been designed for exceptional flexibility and customization. Students can complete a major and a minor, a double major, or a major and two minors. Students can choose a secondary major in an Arts or Science discipline, but the primary major must be in a Science discipline.

All newly admitted students enter the BSc program as "Undeclared." Undeclared means a student has not yet chosen their major(s) and minor(s). Students may declare at any time after being accepted to the BSc, and typically, they declare after completing a minimum of 45 credits. The declaration period for noncompetitive majors and minors is between September 1 and February 15 and between September 1 and January 15 for competitive majors and minors. The Arts and Science Academic Advising Office will send information about majors and minors via email and newsletters; please contact the Advising Office if you require further assistance with this decision.

Science Disciplines

Discipline	Major	Minor	Honours
Applied Statistics	◉	-	◉
Biological Sciences	◉	◉	◉
Chemistry	◉	◉	-
Computer Science	◉	◉	-
Earth and Planetary Sciences	-	◉	-
Environmental Sciences	-	◉	-
Mathematics	◉	◉	◉
Mathematical Sciences	◉	-	-
Planetary Physics	-	◉	-
Physical Sciences	◉	-	-
Physics	-	◉	-
Psychology	◉	◉	◉
Statistics	-	◉	-

Arts Disciplines

Discipline	Major	Minor
Anthropology	◉	◉
Classics		◉
Creative Writing		◉
Economics	◉	◉
English	◉	◉
Film Minor for Arts and Science		◉
French		◉
Gender Studies		◉
History	◉	◉
Philosophy	◉	◉
Political Science	◉	◉
Sociology	◉	◉
Spanish		◉

Out of Faculty Minors

Discipline	Minor
Accounting Minor for Arts and Science	◉

Arts and Cultural Management	◉
Business Law	◉
Business Studies	◉
Digital Experience Design	◉
Finance Minor for Arts and Science	◉
Human Resources Minor for Arts and Science	◉
Marketing Minor for Arts and Science	◉

Laddering a Diploma into the Bachelor of Science

Students with an accredited diploma can ladder into the Bachelor of Science (BSc) and use some of their diploma coursework towards their degree requirements. If you have questions about the diploma laddering process, please visit www.macewan.ca/bscstudent or contact artsandscience@macewan.ca.

Preparing for Professional Studies

Students intending to enter professional programs at other universities can take their pre-professional programs in the Faculty of Arts and Science at MacEwan University. The university offers the first and second years of several pre-professional programs, including chiropractic medicine, dental hygiene, dentistry, medical laboratory science, medicine, optometry, pharmacy, and veterinary medicine. All courses in these pre-professional programs are credit courses, and, as such, they may apply to the degrees offered by MacEwan University.

Students are advised to consult the admissions requirements for the universities and programs of their choice and to select their MacEwan University courses accordingly. Completing pre-professional courses at MacEwan University does not guarantee admission to the subsequent professional program. Each professional program requires a separate application, and entry is competitive, not automatic.

Degree Requirements

Breadth Requirements

All Bachelor of Science degrees require Breadth Requirements. Courses can satisfy both the breadth requirements and requirements for the major(s), minor(s), Honours, or options. BIOL, CHEM, EASC, or PHYS courses must include a laboratory component.

Breadth Element	Description	Credits
Biological or Earth and Planetary Sciences	BIOL or EASC (not including BIOL 101, BIOL 102, or BIOL 103)	6
Chemistry or Physics	CHEM or PHYS	6
English	ENGL 102 and 3 credits in university English (not including ENGL 111, ENGL 108, or ENGL 211)	6
Humanities	CLAS, COMP, HIST, HUMN, PHIL or a language other than English	6
Mathematical Sciences	One of MATH 114, MATH 120, or MATH 125, and 3 credits in MATH, STAT, or CMPT (not including MATH 160, MATH 170, or CMPT 104)	6
Social Sciences	ANTH, ECON, GEND, LING, POLS, PSYC, or SOCI	6

Bachelor of Science Degree

Program Element	Description	Credits
Primary Major	The Science major will range from 42 to 60 credits with a minimum 36 credits taken at the senior-level.[1]	42-60
Secondary Major or Minor(s)	Students have the option of completing a second Science or Arts major, or one or two minors. Minor courses must be completed at the senior-level.[1]	18-60
Options	Students can complete up to 18 credits in out-of-faculty options, with no more than 3 credits in physical activity (PACT) courses	Up to 60
	Total Degree Credits Including Breadth	120

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Multi-disciplinary majors consist of 60-72 junior- and senior-level credits. Students majoring in mathematical or physical sciences may pursue a minor but are not required to do so.

Bachelor of Science Honours

Program Element	Description	Credits
Minimum Honours Requirements	Honours requirements are determined by each discipline.	63
Option Courses, Non-Compulsory Honours Courses, and/or a Minor	Students have the option of completing a minor from outside of the Honours discipline. Some disciplines may require a minor.	57
	Total Degree Credits Including Breadth	120

The minimum passing grade for a course at MacEwan University is a D unless otherwise noted next to the appropriate course in the program of study. In the Faculty of Arts and Science, students typically require a minimum grade of C- to use a course as a prerequisite. Please check course descriptions for more information.

Cross-Faculty Course Recognitions

Cross-Faculty course recognition represents an agreement between programs within MacEwan University and consists of a number of approved courses that have the potential to be recognized within another degree. These courses are not considered transfers or equivalents as the original course will show within a student's transcript and their Academic Planning and Progress Report (APPR). How the courses listed below might be used within a student's degree are determined by the student's program of study. They are dependent on a number of factors including year of declaration, year of completion, and individual program requirements.

Out-of-Faculty Course	Course Recognition	Course Used For
ACUP 117	ARTOP 1XX	Options; fulfills Humanities Breadth
ACUP 209	SCIOP 2XX	Options
ACUP 220, ACUP 303, and ACUP 304 (must complete all three courses)	COSL 200 (6 credits)	Options
ACUP 320	SCIOP 3XX	Options
AGAD 300	COSL 300	Options
AGAD 435	WINL 300	Options
ARTE 104	ARTOP 1XX	Options; fulfills Humanities Breadth
ARTE 214	ARTOP 2XX	Options; fulfills Humanities Breadth
ARTE 224	ARTOP 2XX	Options; fulfills Humanities Breadth
ARTE 234	ARTOP 2XX	Options; fulfills Humanities Breadth
ARTE 304	ARTOP 3XX	Options; fulfills Humanities Breadth
ARTE 314	ARTOP 3XX	Options; fulfills Humanities Breadth
ARTE 324	ARTOP 3XX	Options; fulfills Humanities Breadth
CORR 102	SOCI 1XX	Options or Sociology program requirements; fulfills Social Science Breadth
CORR 104	SOCI 1XX	Options or Sociology program requirements; fulfills Social Science Breadth
CORR 110	SOCI 225	Options or Sociology program requirements; fulfills Social Science Breadth
CORR 120	SOCI 2XX	Options or Sociology program requirements; fulfills Social Science Breadth
CORR 202	ARTOP 2XX	Options
CORR 208	ARTOP 2XX	Options
CORR 214	COSL 200	Options
CORR 218	SOCI 321	Options or Sociology program requirements; fulfills Social Science Breadth
CORR 224	COSL 200	Options
CYCW 100	PSYC 2XX	Options or Psychology program requirements; fulfills Social Science Breadth
CYCW 108 and CYCW 112	SOCI 1XX	Options or Sociology program requirements; fulfills Social Science Breadth
CYCW 115	SOCI 2XX	Options or Sociology program requirements; fulfills Social Science Breadth
CYCW 114	ARTOP 1XX	Options
CYCW 201	PSYC 2XX	Options or Psychology program requirements; fulfills Social Science Breadth
CYCW 204	COSL 200	Options
CYCW 205	SOCI 2XX	Options or Sociology program requirements; fulfills Social Science Breadth
CYCW 206	ARTOP 2XX	Options
CYCW 208	SOCI 2XX	Options or Sociology program requirements; fulfills Social Science Breadth
CYCW 211	SOCI 2XX	Options or Sociology program requirements; fulfills Social Science Breadth
CYCW 302	ARTOP 3XX	Options; fulfills Social Science Breadth

CYCW 303	ARTOP 3XX	Options; fulfills Social Science Breadth
CYCW 339	ARTOP 3XX	Options; fulfills Social Science Breadth
CYCW 340	SOCI 2XX	Options or Sociology program requirements; fulfills Social Science Breadth
CYCW 350	SOCI 2XX	Options or Sociology program requirements; fulfills Social Science Breadth
CYCW 360	SOCI 3XX	Options or Sociology program requirements; fulfills Social Science Breadth
CYCW 361	SOCI 2XX	Options or Sociology program requirements; fulfills Social Science Breadth
CYCW 466	ARTOP 4XX	Options
DESN 270	ARTOP 2XX	Options; fulfills Humanities Breadth
DESN 271	ARTOP 2XX	Options; fulfills Humanities Breadth
ECCS 110	PSYC 1XX	Options or Psychology program requirements; fulfills Social Science Breadth
ECCS 115	ARTOP 1XX	Options
ECCS 160	PSYC 2XX	Options or Psychology program requirements; fulfills Social Science Breadth
ECCS 180	SOCI 2XX	Options or Sociology program requirements; fulfills Social Science breadth
ECCS 220	COSL 200	Options
ECCS 255	ARTOP 2XX	Options
ECCS 260	SOCI 2XX	Options or Psychology program requirements; fulfills Social Science Breadth
ECCS 270	COSL 200	Options
ECCS 310	SOCI 3XX	Options or Sociology program requirements; fulfills Social Science Breadth
ECCS 355	SOCI 3XX	Options or Sociology program requirements; fulfills Social Science Breadth
ECCS 360	SOCI 3XX	Options or Sociology program requirements; fulfills Social Science Breadth
ECCS 425	SOCI 4XX	Options or Sociology program requirements; fulfills Social Science Breadth
ECDV 160	ARTOP 1XX	Options
ECDV 220	COSL 200	Options
ECDV 255	ARTOP 2XX	Options
ECDV 260	SOCI 2XX	Options or Sociology program requirements; fulfills Social Science Breadth
ECDV 270	COSL 270	Options
ECDV 280	PSYC 2XX	Options or Psychology program requirements; fulfills Social Science Breadth
FNCE 301	ECON 3XX	Options or Economics program requirements; fulfills Social Science Breath
HAPR 101	SCIOP 1XX	Options
HAPR 104	ARTOP 1XX	Options
HAPR 114	WINL 200	Options
HAPR 201	ARTOP 2XX	Options
HAPR 212	WINL 200	Options
HEED 110	ARTOP 1XX	Options
HEED 120	SCIOP 1XX	Options
HLSC 104	SCIOP 1XX	Options
HLSC 105	SCIOP 1XX	Options
HLSC 120	BIOL 1XX	Options or Biological Sciences program requirements
HLSC 124	BIOL 1XX	Options or Biological Sciences program requirements
HLSC 126	BIOL 1XX	Options or Biological Sciences program requirements
HLSC 128	BIOL 2XX	Options or Biological Sciences program requirements
HLST 150	SCIOP 1XX	Options
HLST 210	ARTOP 2XX	Options
HLST 290	SCIOP 1XX	Options
INFM 101	ARTOP 1XX	Options
INFM 202	ARTOP 2XX	Options
INFM 208	ARTOP 2XX	Options
INFM 209	ARTOP 2XX	Options
INFM 210	ARTOP 2XX	Options
INFM 260	COSL 200	Options
INTA 210	ARTOP 2XX	Options; fulfills Humanities Breadth
INTA 362	ARTOP 3XX	Options
MTST 120	BIOL 1XX	Options or Biological Sciences program requirements

MTST 122	BIOL 1XX	Options or Biological Sciences program requirements
MTST 125	BIOL 1XX	Options or Biological Sciences program requirements
MTST 126	BIOL 1XX	Options or Biological Sciences program requirements
MTST 161, MTST 162, MTST 260, MTST 261, MTST 262	COSL 200	Options
MUSC 104	ARTOP 1XX	Options
MUSC 123	ARTOP 1XX	Options; fulfills Social Science Breadth
MUSC 124	ARTOP 1XX	Options; fulfills Social Science Breadth
PEDS 100	BIOL 1XX	Options or Biological Sciences program requirements
PEDS 101	BIOL 1XX	Options or Biological Sciences program requirements
PEDS 103	BIOL 2XX	Options or Biological Sciences program requirements
PEDS 109	SCIOP 1XX	Options
PEDS 200	BIOL 2XX	Options or Biological Sciences program requirements
PEDS 203	SCIOP 2XX	Options
PEDS 206	BIOL 2XX	Options or Biological Sciences program requirements
PEDS 207	BIOL 2XX	Options or Biological Sciences program requirements
PEDS 209	ARTOP 2XX	Options
PEDS 240	SCIOP 1XX	Options
PERL 104	ARTOP 1XX	Options
PERL 204	ARTOP 2XX	Options
PERL 207	ARTOP 2XX	Options
PSSC 102	ARTOP 1XX	Options
PSSC 112	ARTOP 1XX	Options
PSSC 121	SOCI 1XX	Options or Sociology program requirements; fulfills Social Science Breadth
PSSC 203	ARTOP 2XX	Options
PSSC 204	ARTOP 2XX	Options
PSSC 212	ARTOP 2XX	Options
PSSC 252	ARTOP 2XX	Options
PSSC 253	ARTOP 2XX	Options
PSSC 272	COSL 200	Options
PSSC 273	COSL 200	Options
SOWK 101	ARTOP 1XX	Options; fulfills Humanities Breadth
SOWK 111	ARTOP 1XX	Options
SOWK 112	ARTOP 1XX	Options
SOWK 203	ARTOP 2XX	Options
SOWK 204	SOCI 2XX	Options or Sociology program requirements; fulfills Social Science Breadth
TAST 101	ARTOP 1XX	Options
TAST 129 and TAST 130	COSL 200	Options
THAR 240	ARTOP 2XX	Options
THAS 101	ARTOP 1XX	Options
THAS 102	SCIOP 1XX	Options
THAS 115	ARTOP 1XX	Options
THAS 203	COSL 200	Options
THAS 210	COSL 200	Options
THAS 211	COSL 200	Options
THAS 214	COSL 200	Options
THAS 222	ARTOP 2XX	Options
THPR 205	ARTOP 2XX	Options; fulfills Humanities Breadth
THPR 206	ARTOP 2XX	Options; fulfills Humanities Breadth
THPR 214	COSL 200	Options
THPR 224	COSL 200	Options

Applied Statistics Requirements

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Applied Statistics Major

The Bachelor of Science (BSc) in Applied Statistics program requires students to complete 120 credits of non-duplicative coursework. In addition to the Applied Statistics Major, students will complete one of the following:

- one minor,
- two minors, or
- a secondary Science major

Students are required to complete option courses as well as the major(s) and minor(s). All BSc degrees require Breadth Requirements. Courses can satisfy both the breadth requirements and requirements for the major(s), minor(s), or options.

The Applied Statistics Major is 42 to 60 credits with a minimum of 36 senior-level credits and a minimum of six credits at the 400-level.

Note: Students majoring in Applied Statistics require STAT 151 or STAT 161, which fulfill the General Major Requirements. Students also need prerequisite courses MATH 114, MATH 115, one of MATH 120 or MATH 125, and CMPT 101 or CMPT 103. These courses fulfill the degree breadth requirements.

Bachelor of Science - Applied Statistics Major

Code	Title	Credits
Specific Major Requirements		
MATH 214	Intermediate Calculus I	3
MATH 215	Intermediate Calculus II	3
MATH 225	Linear Algebra II	3
STAT 265	Probability Theory I	3
STAT 266	Mathematical Statistics	3
STAT 350	Sampling Theory and Applications	3
or STAT 353	Design and Analysis of Experiments	
STAT 378	Applied Regression Analysis	3
STAT 496	Statistical Consulting Project	3
General Major Requirements		
Choose 18 to 36 credits from junior- and senior-level STAT		18-36
Secondary Major or Minor(s)		
Students have the option of completing a second Science major, or one or two minors. Minor courses must be completed at the senior-level.		18-60
Options		
Students can complete up to 18 credits in out-of-faculty options, with no more than 3 credits in physical activity (PACT) courses.		0-60
Total Credits		**120**

Applied Statistics Honours

The Bachelor of Science (BSc) Applied Statistics Honours degree program requires students to complete 120 credits of non-duplicative coursework. The Applied Statistics Honours program is comprised of 81 to 84 credits with a minimum of 12 credits at the 400-level (including STAT 499). Students are required to declare a minor subject as part of the Applied Statistics Honours requirements. Minors are comprised of 18 senior-level credits.

For admittance/acceptance into Applied Statistics Honours, students must present the following:

1. Completion of a minimum of 45 university-level credits applicable to the program of study, with a GPA of 3.0 or higher
2. 24 of the 45 credits must have been completed in the last 12 months
3. Completion of STAT 265 and STAT 266
4. A minimum GPA of 3.3 across all senior-level STAT courses

Students accepted and enrolled in the Applied Statistics Honours program must maintain a minimum overall GPA of 3.0. As well, students must maintain a minimum GPA of 3.3 across all senior-level STAT courses for each 12 consecutive months following acceptance into the Honours program. Failure to maintain a 3.3 Honours GPA will result in the student's program status reverting to a BSc Applied Statistics Major.

All BSc degrees require Breadth Requirements. Courses can satisfy both the breadth requirements and requirements for Honours, minor(s), or options.

Bachelor of Science - Applied Statistics Honours

Code	Title	Credits
Specific Honours Requirements		
STAT 151	Introduction to Applied Statistics	3
or STAT 161	Applied Statistics for the Social Sciences	
MATH 114	Elementary Calculus I	3
MATH 115	Elementary Calculus II	3
MATH 120	Basic Linear Algebra I	3
or MATH 125	Linear Algebra I	
MATH 214	Intermediate Calculus I	3
MATH 215	Intermediate Calculus II	3
MATH 225	Linear Algebra II	3
STAT 265	Probability Theory I	3
STAT 266	Mathematical Statistics	3
STAT 312	Probability Theory II	3
or STAT 370	Applied Time Series Analysis	
STAT 350	Sampling Theory and Applications	3
or STAT 353	Design and Analysis of Experiments	
STAT 372	Applied Multivariate Statistics and Machine Learning	3
STAT 378	Applied Regression Analysis	3
STAT 478	Applied Generalized Linear Models	3
STAT 496	Statistical Consulting Project	3
STAT 499	Honours Thesis	3
General Honours Requirements		
Honours Requirements		
Choose 15 to 18 credits from senior-level STAT with a minimum of three credits at the 400-level		15-18
Required Minor		
Minor discipline chosen in consultation with the Applied Statistics Honours advisor		18
Option Courses		

Students can complete up to 18 credits in out-of-faculty options, with no more than 3 credits in physical activity (PACT) courses.	36-39
Total Credits	**120**

Degree Regulations

Students are strongly encouraged to seek advice from the faculty advisors about program planning.

Academic Residency - Credit Requirements

In addition to the academic residency requirements of the University, upon admission to the Bachelor of Science (BSc), students must complete at MacEwan University:

- A minimum of 24 credits at the senior-level in the major discipline, with 12 of those senior credits completed at the 300- or 400-level. All 400-level requirements are to be completed at MacEwan University.
- If applicable, a minimum of nine credits in a minor at the senior-level, with at least three of those credits completed at the 300- or 400-level.

Students with a previous MacEwan University credential are required to complete a minimum of 45 credits upon admission to the BSc.

Students who hold a baccalaureate degree from another post-secondary institution must complete a minimum of 60 additional MacEwan University credits applicable to the BSc. Forty-five of these credits must be completed while the students is enrolled in the BSc. This credit requirement applies to students who began their studies at MacEwan University and completed a credential at another institution.

Students who interrupt their program and who must apply for readmission to the program will be required to comply with any new regulations upon resumption of their studies.

Breadth Requirements

Courses taken to fulfil the major, minor, or option requirements can also be used to satisfy breadth requirements.

Declaration of a Major and Minor

Students are advised to declare a primary major and minor, or primary major and a secondary major, or a major and two minors by the time they have completed 45 credits. Primary majors are selected from Science disciplines and consist of 42 to 60 junior- and senior-level credits; secondary majors can be from an Science or Arts discipline. Multi-disciplinary majors consist of 60-72 junior- and senior-level credits. Except for students in an Honours program, a maximum of 60 credits may be completed from any one discipline for credit towards the degree. A major and minor cannot be in the same discipline and students may not declare more than one out-of-faculty minor. Students can re-declare their major(s) and/or minor(s) if required.

For students completing multiple majors or minors, the Faculty cannot guarantee a schedule of classes that will permit students to complete their degree in eight consecutive fall and winter semesters. Furthermore, depending on the configuration of the student's degree, meeting the requirements for the degree may require the completion of more than 120 credits for graduation. Students are strongly encouraged to consult with an academic advisor in the Faculty of Arts and Science Advising Office and a discipline advisor in their major and minor prior to this declaration. Students majoring in mathematical or physical sciences may pursue a minor but are not required to do so.

Restricted Enrolment Courses

The Faculty of Arts and Science strives to accommodate all students wishing to enrol in a given course when it is appropriate to their program: however, classes in some courses must, for academic reasons, be restricted in size. If such a course is found to be oversubscribed, priority in registration will be given to those students whose programs may require it (e.g., majors, Honours, and/or minors) and then to other students as space permits.

Graduation Grade Point Average

As part of the Graduation Grade Point Average regulation above, Bachelor of Science students must obtain an overall GGPA of 2.0 or higher, with a minimum GPA of 2.0 on all courses credited toward the major(s) and a minimum GPA of 2.0 on all courses credited toward the minor(s).

Graduation Requirements

Graduation requirements are governed by the date on which a student declares their major(s) and minor(s). Students who declare their major(s) and minor(s) on or before the published deadline are bound by the requirements of the current academic year. Those students who declare after this date are bound by the programs of study and degree requirements of the upcoming academic year as published in the MacEwan Academic Calendar.

Junior - and Senior-Level Courses

Courses numbered from 100 to 199 are considered junior-level and courses numbered from 200 to 499 are considered senior-level.

Major or Minor 300- and 400- Level Requirements

The 300- and 400-level requirements in the major or minor cannot consist solely of project, field placement, and/or individual study courses.

Maximum Independent Courses

The maximum number of credits for independent work (project, field placement, and/or individual study courses) excluding the Honours Thesis, is 15 credits. Specific disciplines may have further restrictions.

Maximum Junior-Level Courses

A maximum of 48 credits at the 100-level are permitted in completion of the B.Sc. degree. Additional courses at the 100-level are extra to the 120 credits required to complete the B.Sc. degree and will not be counted toward fulfilment of graduation requirements.

Minimum Science Courses

Students are required to complete successfully a minimum of 72 total credits from Science courses.

Minimum Passing Grade

A minimum grade of D or credit CR is required for all Science degree courses unless otherwise noted next to the appropriate course in the program of study.

Minimum Transfer Grade for Credit

A minimum grade of D is required on any transfer credit granted for the program. Unless otherwise stated, Arts and Science courses require a minimum grade of C- when the course is used as a prerequisite. Transfer credit decisions made by the university are final and cannot be appealed.

Out-of-Faculty Options Requirements

Students may take a maximum of 18 credits from courses offered by a MacEwan University Faculty or School other than Arts and Science. Students completing an out-of-faculty minor or laddering students who have met the minor requirements with a MacEwan University diploma must complete their degree requirements from courses offered within the Faculty of Arts and Science or from the list of *Cross-Faculty Course Recognitions* in the Academic Calendar. Courses deemed as *Cross-Faculty Course Recognitions* are used to fulfill in-Faculty courses within the BSc and do not count as out-of-Faculty options.

Progression of Studies

Students are responsible for ensuring they meet the prerequisite and/or co-requisite requirements as noted on all courses that may fulfill Bachelor of Science program requirements.

Honours Regulations

Overall Requirements

The Honours program of study consists of 63 to 84 credits as determined by the discipline. Students in the Honours program may choose to complete a minor outside of the Honours discipline. Some disciplines may require a minor.

Acceptance to Honours

For consideration of admittance/acceptance into Honours, students must present a minimum of 45 university-level credits applicable to the program of study, with a GPA of 3.0 or higher. They must complete 24 of the 45 credits in the last 12 months; however, exceptions to this rule may occur with the approval of the Honours discipline advisor. Individual departments may have additional requirements noted in their program of study.

Course Load

Students accepted into an Honours program must complete 24-credits in each twelve consecutive months they are in the program. Exceptions to this rule may occur with the approval of the Honours discipline advisor.

Grade Point Average

Students accepted and enrolled in the Science Honours program must maintain a minimum overall GPA of 3.0 across all courses in the degree. As well, students must maintain a minimum GPA of 3.3 across a set of courses designated by each discipline for each twelve consecutive months following acceptance into the Honours program. Failure to do so will result in the student's program status reverting to BSc with a major in the previous Honours discipline.

Graduation Grade Point Average

In order to graduate, students must obtain an overall GGPA of 3.0 or higher, with a minimum GPA of 3.3 on all courses credited toward the Honours program of study.

Program Learning Outcomes

Faculty of Arts and Science Degree-Level Learning Outcomes

Thinking about knowledge is at the core of University education and learning within the Faculty of Arts and Science. Students develop capacities to "think-through" - to practice wonder, reflection, and engage in thoughtful inquiry and dialogue. Thinking-through involves questioning beyond the confines of one's immediate personal, social, and disciplinary surroundings. First, knowledge is acquired and understood. Learning moves beyond acquiring information and data to a formally disciplined manner of thinking about knowledge. Next, knowledge is interrogated by asking and answering questions, distinguishing between opinion and knowledge, and developing tools to assess reasons and evidence. Finally, knowledge is synthesized as students develop coherent arguments, and link ideas together beyond what is immediately apparent. Learning is a lifelong creative process of discovery and action that happens beyond the classroom and the degree. Our graduates interact with and contribute to their community by integrating and applying the research and communication skills and ways of knowing developed through their education. Learning outcomes capture the observable knowledge, skills, and abilities graduates acquire that are the foundation of learning.

Graduates will demonstrate their ability to "think-through" by:

i. Analysing puzzles, problems, concepts, and theories.
ii. Conceptualizing questions based on disciplinary knowledge.
iii. Evaluating knowledge within and across disciplines in ways that acknowledge historical, cultural, and social contexts.

Graduates will demonstrate research and scholarship skills by:

iv. Applying appropriate research skills and ethical principles.
v. Interpreting results appreciating the value and limits of conclusions.
vi. Recognizing how research involves an ongoing process of reflection, dialogue, and reassessment.

Graduates will demonstrate diverse skills for communication by:

vii. Conveying complex ideas coherently in a variety of formats.
viii. Appraising information in ways that consider context and audience.
ix. Interpreting the ideas and arguments of others in ways that reflect their knowledge, judgement, and comprehension.

Graduates will demonstrate durable skills necessary for learning beyond their degree by:

x. Collaborating with diverse groups.
xi. Examining different perspectives and challenging biases and preconceptions.
xii. Exploring the continuous impact and limitations of disciplinary knowledge and expertise.

Applied Statistics Major Learning Outcomes

1. Analyze and explore a wide range of data using appropriate statistical tools.
2. Write, read, and edit computer code for data processing and analysis.
3. Prepare and present oral and written data analyses reports such that results are meaningful and can be well understood by audiences with little statistical background.
4. Explain and prove basic results from linear algebra, calculus, probability theory, and mathematical statistics.
5. Demonstrate ethical conduct in handling data, statistical analyses, and reporting.

Applied Statistics Honours Learning Outcomes

1. Explore data, select, apply, compare, and evaluate statistical methods, and interpret the results obtained from the statistical analyses in an applied context.

2. Use mathematical tools from calculus and linear algebra to explain and prove results in probability theory and statistics.
3. Prepare and present oral and written data analyses reports such that the results are meaningful and can be well understood by audiences with little statistical background.
4. Design algorithms for simulations or data processing and analysis, and implement them in R or some other computer programming language.
5. Translate real-world problems into statistical questions and work in a collaborative and/or interdisciplinary environment to address these questions.
6. Demonstrate ethical conduct in handling data, statistical analyses, and reporting.

Student Plan

- The student plan provides a suggested course sequence with the minimum number of credits required for the major
- The suggested course sequence depends on course availability, the student's schedule, and the student's choice of minor(s) or secondary major
- It is highly recommended that students complete their Breadth Requirements by the end of year 2
- STAT 151 or STAT 161 fulfills a general major requirement

Year 1	Credits
STAT 151	3
MATH 114	3
MATH 115	3
Choose 3 credits (1 course) from the following:	3
MATH 120	
MATH 125	
Choose 3 credits (1 course) from the following:	3
CMPT 101	
CMPT 103	
ENGL 102	3
Breadth Requirements	12
	30

Year 2	Credits
MATH 214	3
MATH 215	3
MATH 225	3
STAT 265	3
STAT 266	3
Breadth, Option, Minor(s), or Primary or Secondary Major Requirements	15
	30

Year 3	Credits
Choose 3 credits (1 course) from the following:	3
STAT 350	
STAT 353	
STAT 378	3
Choose 9 credits (3 courses) from junior- or senior-level STAT	9
Options, Minor(s), or Primary or Secondary Major Requirements	15
	30

Year 4	Credits
STAT 496	3
Choose 3 credits (1 course) from 400-level STAT	3
Choose 6 credits (2 courses) from senior-level STAT	6
Options, Minor(s), or Primary or Secondary Major Requirements	18
	30

Total Credits 120

Expected Course Offerings

Following is a list of expected course offerings for fall 2024 and winter 2025. While some might change, students can be assured that required courses will be available. Please refer to myStudentSystem for up-to-date course offerings.

Fall 2024

STAT 151	Introduction to Applied Statistics
STAT 161	Applied Statistics for the Social Sciences
STAT 252	Applied Statistics II
STAT 265	Probability Theory I
STAT 370	Applied Time Series Analysis
STAT 371	Applied Categorical Data Analysis
STAT 378	Applied Regression Analysis

Winter 2025

STAT 151	Introduction to Applied Statistics
STAT 161	Applied Statistics for the Social Sciences
STAT 252	Applied Statistics II
STAT 265	Probability Theory I
STAT 266	Mathematical Statistics
STAT 350	Sampling Theory and Applications
STAT 395	Special Topics in Statistics at the intermediate level
STAT 412	Stochastic Processes
STAT 496	Statistical Consulting Project

Admission Requirements

Applicants may be admitted to one of the following:

Regular Admission

To be evaluated through the Office of the University Registrar

Applicants must have a minimum overall average of 65 percent, with no course grade lower than 50 percent, in the following high school courses:

1. ELA 30-1
2. Mathematics 30-1
3. Two of Biology 30, Chemistry 30, Mathematics 31, Physics 30, or Computing Science-Advanced Career and Technology Studies (5 credits)
4. One subject from Group A, B, C or D

Notes:

- A maximum of one Group D subject may be presented. Group D subjects used for admission must be 5-credit or any credit combination of at least 5 credits (e.g., two 3-credit subjects).

Applicants with nine to 23 university-level credits must also present a minimum Admission Grade Point Average (AGPA) of 2.0 on a 4.0 scale. Applicants with 24 or more university-level credits will be considered under Previous Post-Secondary Work.

Mature Admission

To be evaluated through the Office of the University Registrar

Applicants must be Canadian Applicants, 20 years of age or older, and have been out of full-time high school at least one year by the beginning of the intake term. Applicants must have a minimum overall average of 60 percent, with no course grade lower than 50 percent, in the following high school courses:

1. ELA 30-1
2. Mathematics 30-1
3. Two of Biology 30, Chemistry 30, Mathematics 31, Physics 30, or Computing Science-Advanced Level Career and Technology Studies (5 credits)

Applicants with nine to 23 university-level credits must also present a minimum Admission Grade Point Average (AGPA) of 2.0 on a 4.0 scale. Applicants with 24 or more university-level credits will be considered under Previous Post-Secondary Work.

Previous Post-Secondary Work

To be evaluated through the Office of the University Registrar

Admission in this category does not imply or guarantee the transfer of any coursework and/or credential unless a block transfer agreement (internal or external) is in effect and published in the calendar by the Office of the University Registrar. In addition, transfer of coursework does not imply or guarantee that an applicant will be admitted.

Applicants must have successfully completed the following:

- A minimum of 24 university-level credits, from a recognized institution, with a minimum Admission Grade Point Average (AGPA) of 2.0 on a 4.0 scale.
- The required mathematics and science courses listed under the Regular or Mature Admission category.

Additional Admission Criteria

All applicants must meet the following:

1. English Language Proficiency

To be evaluated through the Office of the University Registrar

Applicable to All Admission Categories

All applicants must meet an acceptable level of English language proficiency. We will require official documents such as high school or post-secondary transcripts or proof of successful completion of standardized language evaluation. Full details are available in MacEwan University's academic calendar or online at MacEwan.ca/ELP (http://MacEwan.ca/ELP/).

2. Other Admission Criteria

To be evaluated through the Office of the University Registrar

Applicable to All Admission Categories

Applicants who have been assigned two unsatisfactory academic records within the past five years will not be considered for admission or re-admission to the program until a minimum three years from the date of the assignment of the last unsatisfactory academic record. For the purpose of admission or re-admission, an unsatisfactory record is defined as a transcript with the notation 'required to withdraw' or equivalent.

Applied Statistics Courses

STAT 151
Introduction to Applied Statistics
3 Credits Weekly (3-1.5-0)
In this course the following topics are covered: data collection and presentation; descriptive statistics; probability distributions, sampling distributions and the central limit theorem; point estimation, confidence intervals, and hypothesis testing; one-way ANOVA; Chi-square tests; and correlation and regression analysis. Applications are taken from a broad variety of fields such as biological and medical sciences, engineering, social sciences and economics. Note: This course may not be taken for credit if credit has been obtained in Stat 161.
Prerequisites: Mathematics 30-1 or Mathematics 30-2 or successful completion of the statistics gateway exam.

STAT 161
Applied Statistics for the Social Sciences
3 Credits Weekly (3-1.5-0)
This course provides an introduction to descriptive and inferential statistics with a focus on data analytic tools particularly relevant in the social sciences. Topics covered in this course include descriptive statistics, basic probability theory and the central limit theorem; estimation and hypothesis testing; t-tests, analysis of contingency tables, one way ANOVA, and multiple linear regression analysis. Applications are taken from the social sciences and many other fields such as biological and medical sciences, engineering, and economics. Note: Credit cannot be obtained in both STAT 151 and 161.
Prerequisites: Mathematics 30-1 or Mathematics 30-2 or successful completion of the statistics gateway exam.

STAT 252
Applied Statistics II
3 Credits Weekly (3-2-0)
Fundamental methods in applied statistics are presented in this course including the following topics: factorial ANOVA and Linear Regression models and their analysis as well as non-parametric statistical tools for the comparison of the centre of distributions. Applications are taken from a broad variety of areas such as biological, social and computer sciences, engineering, and economics.
Prerequisites: A minimum grade of C- in one of STAT 151 or STAT 161.

STAT 265
Probability Theory I
3 Credits Weekly (3-0-1)
This course offers a calculus-based introduction to probability theory. Topics covered include sample space, events, combinatorial probability, conditional probability, independent events, Bayes' theorem, discrete and continuous random variables, univariate and multivariate probability distributions, expectation, conditional expectation, joint probability distributions, independence, moment generating functions. Note: STAT 151 is recommended and MATH 214 is a recommended corequisite.
Prerequisites: A minimum grade of C- in MATH 115.

STAT 266
Mathematical Statistics
3 Credits Weekly (3-1-1)
The emphasis of this course is to present the fundamental statistical concepts in estimation and hypothesis testing from a classical perspective using the tools of probability theory. Topics covered include: limit theorems, sampling distributions, methods of point estimation and properties of point estimators, interval estimation, testing hypotheses. Statistical software is used to simulate distributions and probabilistic processes that lead to statistical applications.
Prerequisites: Minimum grades of C- in STAT 265, STAT 151 or STAT 161, and in either CMPT 101 or CMPT 103.

STAT 312
Probability Theory II
3 Credits Weekly (3-0-0)
This course offers a rigorous approach to probability theory. Topics covered include concepts of probability theory, multivariate random variables, conditional expectation and variance, probability and moment generating functions, the multivariate normal distribution, different types of convergence and limit theorems, Poisson and branching processes.
Prerequisites: Minimum grades of C- in MATH 215, MATH 225, and STAT 265.

STAT 322
Finite Markov Chains and Applications
3 Credits Weekly (3-0-1)
This course presents fundamental results regarding finite Markov chains. Topics covered include connection with matrix theory, classification of states, main properties of absorbing, regular and ergodic finite Markov chains. Applications to genetics, psychology, computing science and engineering are also included.
Prerequisites: Minimum grades of C- in either MATH 120 or MATH 125, and in STAT 265; a minimum grade of C- in Math 214 is recommended.

STAT 324
Computational Statistics with R
3 Credits Weekly (2-2-0)
This course explores the usage of computer programming and algorithms in the field of statistics. The focus of the course will be computationally intensive statistical methods, such as Monte Carlo simulations, the expectation-maximization algorithm, and bootstrapping. The material will be illustrated and the students' work will be carried out using R (a free, open source, multi-platform programming language).
Prerequisites: Minimum grades of C- in STAT 266, and in either CMPT 101 or CMPT 103.

STAT 350
Sampling Theory and Applications
3 Credits Weekly (3-0-0)
This course concentrates on the design and analysis techniques for sample surveys. Topics include simple random sampling, stratified sampling, ratio, regression and difference estimation, single-stage cluster sampling, systematic sampling, two-stage cluster sampling.
Prerequisites: A minimum grade of C- in STAT 265.

STAT 353
Design and Analysis of Experiments
3 Credits Weekly (3-2-0)
This course deals with design, conduct and analysis of experimental studies. Topics include: principles of design, completely randomized design with one factor, randomized complete block designs, Latin square design, Graeco-Latin square design, balanced incomplete block design, factorial design, two-level factorial design, two-level factorial design in incomplete blocks, two-level fractional factorial design, experiments with random factors, and nested and split-plot designs.
Prerequisites: A minimum grade of C- in STAT 266.

STAT 370
Applied Time Series Analysis
3 Credits Weekly (3-2-0)
This is an introductory course in applied time series analysis. Topics include computational techniques in time domain for simple time series models. Model selection, estimation, and forecasting are illustrated for the autoregressive, moving average, ARMA, ARIMA and SARIMA models. Applications are taken from medical and social sciences, biology, engineering and business.
Prerequisites: Minimum grades of C- in STAT 266, MATH 214, and MATH 225.

STAT 371
Applied Categorical Data Analysis
3 Credits Weekly (3-2-0)
This course presents fundamental methods in categorical data analysis emphasizing applications. Topics include: analysis of two-way tables, models for binary response variables, loglinear models, and models for ordinal data and multinomial response data.
Prerequisites: A minimum grade of C- in either STAT 252 or STAT 266.

STAT 372
Applied Multivariate Statistics and Machine Learning
3 Credits Weekly (3-2-0)
This course focuses on essential multivariate statistical methods. Topics include matrix algebra, tests of significance, principal components analysis, factor analysis, discriminant analysis, cluster analysis and canonical correlation analysis. This course is relevant to working professionals in health, social biological and behavioral sciences who engage in applied research in their field.
Prerequisites: Minimum grades of C- in STAT 265, one of MATH 120 or MATH 125, and one of STAT 151 or STAT 161.

STAT 378
Applied Regression Analysis
3 Credits Weekly (3-2-0)
The course introduces methods in regression analysis. Topics include: multiple linear regression with particular focus on diagnostics, non-linear regression, and generalized linear models, such as Poisson regression and logistic regression. Emphasis will be placed on the practical application of the statistical methods.
Prerequisites: Minimum grades of C- in either STAT 266 or in all of STAT 252, MATH 114, and either MATH 120 or MATH 125.

STAT 395
Special Topics in Statistics at the intermediate level
3 Credits Weekly (3-0-1)
In this course students examine a topic in Statistics at the intermediate level. Topics vary and are announced prior to registration. Consult with faculty members in Statistics for details regarding current offerings. Note: This course may be taken multiple times for credit.
Prerequisites: A minimum grade of B- in STAT 265 and consent of the department.

STAT 398
Independent Study
3 Credits Total (0-0-45)
This course permits an intermediate-level student to work with an instructor to explore a specific topic in depth through research or directed reading in primary and secondary sources. The student plans, executes and reports the results of their independent research or study project under the direction of a faculty supervisor. To be granted enrollment in the course, the student must have made prior arrangements with a faculty member willing to supervise his or her project. This course can be taken twice for credit.
Prerequisites: Consent of the Department.

STAT 412
Stochastic Processes
3 Credits Weekly (3-2-0)
This course presents fundamental results regarding discrete and continuous time Markov chains, branching processes, random walks, birth and death processes, semi-Markov processes, and Brownian motions. A practical but rigorous approach to stochastic processes will be utilized, with a focus on building models and understanding them mathematically.
Prerequisites: Minimum grades of C- in CMPT 101 or CMPT 103, MATH 214, MATH 225, STAT 266, and an additional three credits in any 300-level STAT *(*https://calendar.macewan.ca/course-descriptions/stat/*) course.*

STAT 465
Probability Theory and Mathematical Statistics II
3 Credits Weekly (3-1-0)
This course offers a rigorous approach to probability theory and mathematical statistics. Topics include conditional expectation and variance, multivariate normal distribution, convergence, laws of large numbers, central limit theorem, maximum likelihood estimator and its properties, Delta method, likelihood ratio tests, Taylor and Edgeworth expansions.
Prerequisites: A minimum grade of C- in Math 225, STAT 266 and any 300-level statistics course.

STAT 478
Applied Generalized Linear Models
3 Credits Weekly (3-2-0)
The course introduces the theory of generalized linear models and their applications. Topics include exponential family of distributions, modeling binomial and count data, linear mixed models, gamma and inverse-Gaussian generalized linear models, and introduction to survival analysis. Emphasis will be placed on the practical application of the statistical methods.
Prerequisites: A minimum grade of C- in both STAT 266 and STAT 378.

STAT 495
Special Topics in Statistics
3 Credits Weekly (3-0-1)
In this course, students examine an advanced topic in Statistics. Topics vary and are announced prior to registration. Consult with faculty members in Statistics for details regarding current offerings. Note: This course may up to three times for credit provided the topic is different.
Prerequisites: Minimum grade of B- in a 300-level STAT *(*https://calendar.macewan.ca/course-descriptions/stat/*) course and consent of the department.*

STAT 496
Statistical Consulting Project
3 Credits Total (0-0-45)
The aim of the course is to provide students with experience in statistical consultation. Students are assigned to research projects as consultants, which requires them to consider ethical statistical practice, choose the appropriate statistical technique, and communicate the results to a non-mathematical audience.
Prerequisites: A minimum grade of C- in two 300-level STAT *(*https://calendar.macewan.ca/course-descriptions/stat/*) courses and consent of the department.*

STAT 498
Advanced Independent Study
3 Credits Total (0-0-45)
This course permits senior-level students to work with an instructor to explore a specific topic in depth through research or directed reading in primary and secondary sources. The student plans, executes and reports the results of their independent research or study project under the direction of a faculty supervisor. To be granted enrollment in the course, the student must have made prior arrangements with a faculty member willing to supervise his or her project. This course can be taken twice for credit.

STAT 499
Honours Thesis
3 Credits Total (0-0-45)
Under the direction of a faculty supervisor, registered students explore a specific topic in depth through research or directed reading. The student plans, executes, and reports the results of their independent research or study project under the direction of a faculty supervisor in a written Honours Thesis with oral defense. Note: This course is intended for students in the final year of their degree and is open only to students in the Applied Statistics Honours program.
Prerequisites: Consent of the Department.