

**Department of Statistics  
University of Manitoba**

**Undergraduate Course and Program Changes  
Starting Fall 2020**

**1. Introduction:**

This document briefly summarizes the Undergraduate course and program changes put in place by the Department of Statistics for the Fall 2020 academic term. These proposed course and program changes were approved by the Departmental Council on May 23, 2019, and the University of Manitoba Senate on December 4, 2019.

**2. Summary of Program Changes:**

The following points highlight the most important aspects of our program changes:

- we have introduced a variety of new courses,
- we reduced course dependencies by having shorter sequences of prerequisites,
- we have added significant flexibility in how students can satisfy degree requirements,
- we removed the “area of application” requirements from our previous programs,
- we put a stronger emphasis on applied and computational courses,
- we distinguished the honours and major programs by making the major less focused on traditional theoretical courses and adding flexibility by having more optional courses (rather than required courses),
- we added a required course (COMP 1020) and a sequence of optional courses in Computer Science,
- we reduced the required courses, while allowing for more options in Mathematics,
- we now offer a Co-op option to all of our Joint Honours programs, with the exception of the Joint program with Actuarial Mathematics.

Although we have generally increased the number of Credit Hours (CH) of optional courses and reduced the number of CH of required courses, more specific details on our approved changes can be found in the appropriate revised program charts for each program. These can be found in this document in the following tables :

- B.Sc. Honours in Statistics: see Tables 1 and 2;
- B.Sc. Major in Statistics: see Tables 3 and 4;
- B.Sc. Joint Honours in Statistics and Actuarial Mathematics: see Tables 5 and 6;
- B.Sc. Joint Honours in Statistics and Mathematics: see Tables 7 and 8;
- B.Sc. Joint Honours in Statistics and Computer Science: see Tables 9 and 10;
- B.Sc. Joint Honours in Statistics and Economics: see Tables 11 and 12.

Note that the same tables for course and CH requirements should be used for the Co-op options that are available.

Associated with our suggested program changes, there are a number of course additions/deletions and modifications. Course additions and deletions are presented in Table 13. With the exception of STAT 4000, these are all courses that are either required or optional in our degrees. Course modifications, having to do with a change in title, with a slightly modified list of topics, with the

introduction of a lab and/or a change in prerequisites, are presented in Table 14. See the official academic calendar for full course descriptions.

### 3. Transition Plan:

It is expected that the transition to the new program should be reasonably smooth. In order to clarify the situation, Table 15 gives the mapping of new courses being used to graduate under any of our old programs (Honours, Major and Joint Honours) and Table 16 gives the mapping of old courses being used to graduate under any of the new programs. In these tables, we only display required courses as optional courses will easily be accommodated: any previously required MATH or STAT course that is not required under a new program will be usable to satisfy the requirements of CH in relevant optional courses.

Table 1: Overview of program requirements for B.Sc. Honours in Statistics (bolded courses are new program requirements, struck-through courses are deletions from the old program requirements). A Co-op option is available based on the same course requirements.

<b>B.Sc. Honours in Statistics 120 Credit Hours (CH)</b> (comprising courses listed in chart below, and electives)			
<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
MATH 1220 <sup>1</sup> MATH 1230 <sup>1</sup> MATH 1232 <sup>1</sup> MATH 1240  STAT 1150 <sup>1</sup>	<del>MATH 2030</del> MATH 2080 MATH 2150 <sup>1</sup>  STAT 2400 <b>STAT 2800</b>	<del>STAT 3050</del> <del>STAT 3400</del> <del>STAT 3470</del> <del>STAT 3480</del> <del>STAT 3800</del>  <b>STAT 3030</b> <b>STAT 3100</b> <b>STAT 3150</b> <b>STAT 3450</b> <b>STAT 3690</b>	STAT 4100 <del>STAT 4200</del> <del>STAT 4520</del> <del>STAT 4530</del>
To be taken sometime in years 1 or 2:  COMP 1010, <b>COMP 1020</b> STAT 2150, <b>STAT 2300</b>  6 CH of optional MATH and/or COMP courses <sup>2</sup>  15 CH of other optional courses and electives <sup>2</sup>		To be taken sometime in years 3 or 4:  24 CH of optional STAT courses, with at least 15 CH at the 4000 level <sup>2</sup>  6 CH of optional MATH, COMP and/or STAT courses <sup>2</sup>  12 CH of electives <sup>2</sup>	

<sup>1</sup> Some substitutions are allowed for these courses – see the official academic calendar.

<sup>2</sup> See the official academic calendar about the choice of optional courses and electives. In particular, updated lists of optional courses can be found there.

Table 2: Summary of requirements in credit hours (CH) for B.Sc. Honours in Statistics

**Program requirements in CH – old program**

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STAT required	STAT options	MATH required	COMP required	MATH options	Arts options	Other options + electives
36 <sup>1</sup>	15 <sup>1</sup>	21	3	6	6	33

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<sup>1</sup> Of these altogether, a minimum of 21 CH had to be at the 4000 level

**Program requirements in CH – new program**

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STAT required	STAT options	MATH required	COMP required	MATH, STAT and/or COMP options	Arts options	Other options + electives
33 <sup>2</sup>	24 <sup>2</sup>	18	6	12 <sup>3</sup>	6	21

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<sup>2</sup> Of these altogether, a minimum of 18 CH must be at the 4000 level

<sup>3</sup> Of these, a minimum of 6 CH must be from MATH and/or COMP

Table 3: Summary of requirements in credit hours (CH) for B.Sc. Major in Statistics

**Program requirements in CH – old program**

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STAT required	STAT options	MATH required	COMP required	MATH options	Arts options	Other options + electives
36 <sup>1</sup>	15 <sup>1</sup>	21	3	6	6	33

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<sup>1</sup> Of these altogether, a minimum of 15 CH had to be at the 4000 level

**Program requirements in CH – new program**

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STAT required	STAT options	MATH required	COMP required	MATH, STAT and/or COMP options	Arts options	Other options + electives
27 <sup>2</sup>	24 <sup>2</sup>	15	6	15 <sup>3</sup>	6	27

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<sup>2</sup> Of these altogether, a minimum of 15 CH must be at the 4000 level

<sup>3</sup> Of these, a minimum of 6 CH must be from MATH and/or COMP

Table 4: Program requirements for B.Sc. Major in Statistics (bolded courses are new program requirements, struck-through courses are deletions from the old program requirements). A Co-op option is available based on the same course requirements.

<b>B.Sc. Major in Statistics 120 Credit Hours (CH)</b> (comprising courses listed in chart below, and electives)			
<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
MATH 1220 <sup>1</sup> MATH 1230 <sup>1</sup> MATH 1232 <sup>1</sup> MATH 1240  STAT 1150 <sup>1</sup>	<del>MATH 2030</del> <del>MATH 2080</del> MATH 2720  STAT 2400 <b>STAT 2800</b>	<del>STAT 3050</del> <del>STAT 3400</del> <del>STAT 3470</del> <del>STAT 3480</del> <del>STAT 3800</del>  <b>STAT 3100</b> <b>STAT 3150</b> <b>STAT 3450</b> <b>STAT 3690</b>	<del>STAT 4100</del> <del>STAT 4200</del> <del>STAT 4520</del> <del>STAT 4530</del>
To be taken sometime in years 1 or 2:  COMP 1010, <b>COMP 1020</b> STAT 2150, <b>STAT 2300</b>  6 CH of optional MATH and/or COMP courses <sup>2</sup>  18 CH of other optional courses and electives <sup>2</sup>		To be taken sometime in years 3 or 4:  24 CH of optional STAT courses, with at least 15 CH at the 4000 level <sup>2</sup>  9 CH of optional MATH, COMP and/or STAT courses <sup>2</sup>  15 CH of electives <sup>2</sup>	

<sup>1</sup> Some substitutions are allowed for these courses – see the official academic calendar.

<sup>2</sup> See the official academic calendar about the choice of optional courses and electives.

Table 5: Program requirements for B.Sc. Joint Honours in Statistics and Actuarial Mathematics (bolded courses are new program requirements, struck-through courses are deletions from the old program requirements).

<b>B.Sc. Joint Honours in Statistics and Actuarial Mathematics 120 Credit Hours (CH)</b> (comprising courses listed in chart below, and electives)			
<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
MATH 1220 <sup>1</sup>	MATH 2720	<del>STAT 3050</del>	STAT 4100
MATH 1230 <sup>1</sup>		<del>STAT 3470</del>	<del>STAT 4200</del>
MATH 1232 <sup>1</sup>	<b>STAT 2300</b>	<del>STAT 3480</del>	<del>STAT 4520</del>
MATH 1240	STAT 2400	<del>STAT 3490</del>	<del>STAT 4530</del>
	<b>STAT 2800</b>	<del>STAT 3800</del>	
STAT 1150 <sup>1</sup>	<del>STAT 3400</del>	<b>STAT 3030</b>	ACT 4020
STAT 2150 (B)		<b>STAT 3100</b>	ACT 4030
	ACC 1010	<b>STAT 3450</b>	ACT 4060
ECON 1010	ACT 2020		ACT 4160
ECON 1020	ACT 2120	ACT 3340	MSCI 2150
	ACT 2210	ACT 3630 <sup>1</sup>	
6 CH of options and electives <sup>2</sup>	FIN 2200		9 CH of STAT options <sup>2</sup>
	3 CH of electives <sup>2</sup>	3 CH of STAT options <sup>2</sup>	3 CH of electives <sup>2</sup>
		9 CH of electives <sup>2</sup>	

<sup>1</sup> Some substitutions are allowed for these courses – see the official academic calendar.

<sup>2</sup> See the official academic calendar about the choice of optional courses and electives.

Table 6: Summary of requirements in credit hours (CH) for B.Sc. Joint Honours in Statistics and Actuarial Mathematics

<b>Program requirements in CH – old program</b>						
STAT required	STAT options	Asper/ECON required	Asper/ECON options	MATH required	'W' course	Other electives
39 <sup>1</sup>	0	45	0	15	3	18

<sup>1</sup> Of these, exactly 12 CH were at the 4000 level

<b>Program requirements in CH – new program</b>						
STAT required	STAT options	Asper/ECON required	Asper/ECON options	MATH required	'W' course	Other electives
27 <sup>2</sup>	12 <sup>2</sup>	45	0	15	3	18

<sup>1</sup> Of these altogether, a minimum of 12 CH must be at the 4000 level

Table 7: Summary of requirements in credit hours (CH) for B.Sc. Joint Honours in Statistics and Mathematics

<b>Program requirements in CH – old program</b>						
STAT required	STAT options	MATH required	MATH options	COMP required	Arts options	Other options + electives
33 <sup>1</sup>	0	54	6	3	6	18

<sup>1</sup> Of these, exactly 9 CH were at the 4000 level

<b>Program requirements in CH – new program</b>						
STAT required	STAT options	MATH required	MATH options	COMP required	Arts options	Other options + electives
27 <sup>2</sup>	6 <sup>2</sup>	54	6	3	6	18

<sup>3</sup> Of these altogether, a minimum of 9 CH must be at the 4000 level

Table 8: Program requirements for B.Sc. Joint Honours in Statistics and Mathematics (bolded courses are new program requirements, struck-through courses are deletions from the old program requirements). A Co-op option is available based on the same course requirements.

<b>B.Sc. Joint Honours in Statistics and Mathematics 120 Credit Hours (CH)</b> (comprising courses listed in chart below, and electives)			
<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
MATH 1220 <sup>1</sup> MATH 1230 <sup>1</sup> MATH 1232 <sup>1</sup> (B) MATH 1240	MATH 2020 MATH 2080 MATH 2090 MATH 2150 MATH 2160 MATH 2180  STAT 2400 <b>STAT 2800</b>	<del>STAT 3050</del> <del>STAT 3400</del> <del>STAT 3470</del> <del>STAT 3480</del> <del>STAT 3800</del>  <b>STAT 3030</b> <b>STAT 3100</b> <b>STAT 3150</b> <b>STAT 3450</b>	STAT 4100 <del>STAT 4520</del> <del>STAT 4530</del>
To be taken sometime in years 1 or 2:  STAT 1150 <sup>1</sup> , STAT 2150 (B) COMP 1010  6 CH of optional Arts courses <sup>2</sup>  9 CH of other electives		To be taken sometime in years 3 or 4:  MATH 2030, MATH 3320, MATH 3322, MATH 3340, MATH 3440, MATH 3460, MATH 3470, MATH 3472  12 CH of optional MATH and STAT courses <sup>2</sup>  9 CH of electives <sup>2</sup>	

<sup>1</sup> Some substitutions are allowed for these courses – see the official academic calendar.

<sup>2</sup> See the official academic calendar about the choice of optional courses and electives.

Table 9: Program requirements for B.Sc. Joint Honours in Statistics and Computer Science (bolded courses are new program requirements, struck-through courses are deletions from the old program requirements). A Co-op option is available based on the same course requirements.

<b>B.Sc. Joint Honours in Statistics and Computer Science 120 Credit Hours (CH)</b> (comprising courses listed in chart below, and electives)			
<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
MATH 1220 <sup>1</sup>	MATH 2080	COMP 3170	STAT 4100
MATH 1230 <sup>1</sup>	MATH 2150 <sup>1</sup>	COMP 3380	<del>STAT 4520</del>
MATH 1232 <sup>1</sup>			<del>STAT 4530</del>
MATH 1240	COMP 2080	<del>STAT 3050</del>	27 CH of options and electives <sup>2</sup>
	COMP 2140	<del>STAT 3400</del>	
COMP 1010	COMP 2150	<del>STAT 3470</del>	
COMP 1020 (B)	COMP 2160	<del>STAT 3480</del>	
	<del>COMP 2190</del>	<del>STAT 3800</del>	
STAT 1150 <sup>1</sup>		<b>STAT 3030</b>	
STAT 2150 (B)	<b>STAT 2300</b>	<b>STAT 3100</b>	
	STAT 2400	<b>STAT 3150</b>	
6 CH of optional Arts courses <sup>2</sup>	<b>STAT 2800</b>	<b>STAT 3450</b>	
	3 CH of electives <sup>2</sup>	12 CH of electives <sup>2</sup>	

<sup>1</sup> Some substitutions are allowed for these courses – see the official academic calendar.

<sup>2</sup> See the official academic calendar about the choice of optional courses and electives.



Table 10: Summary of requirements in credit hours (CH) for B.Sc. Joint Honours in Statistics and Computer Science

<b>Program requirements in CH – old program</b>						
STAT required	STAT options	COMP required	COMP options	MATH required	Arts options	Other options + electives
33 <sup>1</sup>	6 <sup>1</sup>	27	12	18	6	18

<sup>1</sup> Of these altogether, a minimum of 15 CH had to be at the 4000 level

<b>Program requirements in CH – new program</b>						
STAT required	STAT options	COMP required	COMP options	MATH required	Arts options	Other options + electives
30 <sup>2</sup>	9 <sup>2</sup>	24	12	18	6	21

<sup>2</sup> Of these altogether, a minimum of 12 CH must be at the 4000 level

Table 11: Summary of requirements in credit hours (CH) for B.Sc. Joint Honours in Statistics and Economics

<b>Program requirements in CH – old program</b>						
STAT required	STAT options	ECON required	ECON options	MATH required	'W' course + COMP required	Other options + electives
36 <sup>1</sup>	0	24	21	30	6	3

<sup>1</sup> Of these, exactly 12 CH were at the 4000 level

<b>Program requirements in CH – new program</b>						
STAT required	STAT options	ECON required	ECON options	MATH required	'W' course + COMP required	Other options + electives
27 <sup>2</sup>	15 <sup>2</sup>	24	21	24	6	3

<sup>2</sup> Of these, a minimum of 12 CH must be at the 4000 level

Table 12: Program requirements for B.Sc. Joint Honours in Statistics and Economics (bolded courses are new program requirements, struck-through courses are deletions from the old program requirements). A Co-op option is available based on the same course requirements.

<b>B.Sc. Joint Honours in Statistics and Economics 120 Credit Hours (CH)</b> (comprising courses listed in chart below, and electives)			
<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
MATH 1220 <sup>1</sup>	<del>MATH 2030</del>	MATH 2160	STAT 4100
MATH 1230 <sup>1</sup>	MATH 2080	<del>MATH 3360</del>	STAT 4200
MATH 1232 <sup>1</sup>	<del>MATH 2140</del>	<b>MATH 3610</b>	<del>STAT 4520</del>
MATH 1240	MATH 2150 <sup>1</sup>		STAT 4530
		<del>STAT 3400</del>	
COMP 1010	STAT 2150	STAT 3470	ECON 4040
	<b>STAT 2300</b>	<del>STAT 3480</del>	ECON 4042
STAT 1150 <sup>1</sup>	STAT 2400	STAT 3490	
	<b>STAT 2800</b>	<del>STAT 3800</del>	9 CH of STAT options <sup>2</sup>
ECON 1010 <sup>1</sup>		<b>STAT 3100</b>	
ECON 1020 <sup>1</sup>	ECON 2010	<b>STAT 3150</b>	
	ECON 2020	<b>STAT 3450</b>	12 CH of ECON options <sup>2</sup>
6 CH of electives <sup>2</sup>		ECON 3010	
	6 CH of ECON options <sup>2</sup>	ECON 3020	
		3 CH of ECON options <sup>2</sup>	
		6 CH of STAT options <sup>2</sup>	

<sup>1</sup> Some substitutions are allowed for these courses – see the official academic calendar.

<sup>2</sup> See the official academic calendar about the choice of optional courses and electives.

Table 13: Deletions and introductions of STAT courses

**Course Deletions**

Course Number	Course Title	Lab	Credit Hours
3050	Introduction to Probability Theory & Its Applications	No	3
3400	Introduction to Probability II	Yes	3
3470	Statistical Methods for Research Workers 1	No	3
3480	Statistical Methods for Research Workers 2	No	3
3800	Mathematical Statistics	Yes	3
4200	Statistical Inference 2	No	3
4580	Sampling Techniques 2	No	3
4590	Design of Experiments 2	No	3
4690	Applied Multivariate Analysis	No	3

**Course Introductions**

Course Number	Course Title	Lab	Credit Hours
2300	Principles of Data Collection	No	3
2800	Introduction to Probability 2	Yes	3
3030	Introduction to Stochastic Processes	No	3
3100	Introduction to Statistical Inference	Yes	3
3150	Statistical Computing	No	3
3450	Linear Models	No	3
3550	Nonlinear Regression Models	No	3
3690	Multivariate Analysis	No	3
4000	Applied Statistical Modelling	No	3
4150	Bayesian Analysis and Computing	Yes	3
4250	Statistical Learning	Yes	3

Table 14: Course modifications (all courses labelled STAT)

<b>Course Modifications</b>			
Course Number	New Course Title	Lab	Credit Hours
1150	Introduction to Statistics and Computing	Yes	3
2150	Statistics and Computing	Yes	3
2400	Introduction to Probability 1	Yes	3
3000	Applied Linear Statistical Models	No	3
3170	Statistical Process Control	No	3
3380	Introduction to Nonparametric Statistics	No	3
3490	Time Series Analysis	No	3
4100	Statistical Inference	Yes	3
4170	Lifetime Data Analysis	No	3
4520	Sampling Techniques	No	3
4530	Design of Experiments	No	3
4600	Topics in Statistics	No	3
4630	Stochastic Processes	No	3
4700	Statistical Consulting	No	3

Table 15: Course mapping for the transition: satisfying graduation requirements for previous programs using new course offerings

<b>Course Required</b> Under Previous Programs	Acceptable Replacement Among Introduced Courses
STAT 1150	none (course still offered)
STAT 2150	none (course still offered)
STAT 2400	none (course still offered)
STAT 3050	STAT 3030
STAT 3400	STAT 2800
STAT 3470	STAT 3450
STAT 3480	STAT 2300
STAT 3490	none (course still offered)
STAT 3800	STAT 3100
STAT 4100	none (course still offered) <sup>1</sup>
STAT 4200	Any 4000 level STAT course
STAT 4520	none (course still offered) <sup>2</sup>
STAT 4530	none (course still offered) <sup>2</sup>

<sup>1</sup> Course is now optional for B.Sc. Major in Statistics.

<sup>2</sup> Course is now optional under in all B.Sc. Major, Honours and Joint Honours in Statistics.

<b>Optional Courses</b> Under Previous Programs <sup>2</sup>	Acceptable Replacement Among Introduced Courses
STAT 3170	none (course still offered)
STAT 3380	none (course still offered)
STAT 3490	none (course still offered)
STAT 4170	none (course still offered)
STAT 4580	none
STAT 4590	none
STAT 4600	none (course still offered)
STAT 4630	none (course still offered)
STAT 4690	STAT 3690
STAT 4700	none (course still offered)
New courses that would be acceptable options	STAT 3150 STAT 3550 STAT 4150 STAT 4250

<sup>2</sup> For the previous B.Sc. Honours and Major in Statistics, 15 CH of optional courses need to be selected among these.

Table 16: Course mapping: satisfying graduation requirements for new programs using previous course offerings

<b>Course Required Under New Programs</b>	<b>Acceptable Replacement Among Deleted Courses</b>
STAT 1150	none (course was offered)
STAT 2150	none (course was offered)
STAT 2300	STAT 3480
STAT 2400	none (course was offered)
STAT 2800	STAT 3400
STAT 3030	STAT 3050
STAT 3100	STAT 3800
STAT 3150	none
STAT 3450	STAT 3470
STAT 3690	STAT 4690
STAT 4100	none (course was offered)
<b>Optional Courses Under New Programs<sup>1</sup></b>	<b>Acceptable Replacement Among Deleted Courses</b>
STAT 3030 <sup>2</sup>	STAT 3050
STAT 3170	none (course was offered)
STAT 3380	none (course was offered)
STAT 3490	none (course was offered)
STAT 3550	none
STAT 4100 <sup>3</sup>	none (course was offered)
STAT 4150	none
STAT 4170	none (course was offered)
STAT 4250	none
STAT 4520	none (course was offered)
STAT 4530	none (course was offered)
STAT 4600	none (course was offered)
STAT 4630	none (course was offered)
STAT 4700	none (course was offered)

<sup>1</sup> For the new B.Sc. Honours and Major in Statistics, between 24 and 33 CH of optional courses need to be selected among these.

<sup>2</sup> Acceptable option in the B.Sc. Major and in some Joint Honours only – course is required in B.Sc. Honours and in some Joint Honours.

<sup>3</sup> Acceptable option in the B.Sc. Major – course is required in all B.Sc. Honours and Joint Honours.