

**Faculty of Arts and Science
Department of Mathematics and
Statistics**

**Advice for students in year 2 in 2011/12
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Chair of Undergraduate Studies O. A. Nielsen
Assistant Chair of Undergraduate Studies A. Ableson

Some important things to note:

1. Students wanting advice about courses or programs should consult Professor Nielsen, either by e-mail (ugchair@mast.queensu.ca) or by coming to the mathematics and statistics office (on the third or ground-level floor of Jeffrey Hall) and asking for him.
2. MATH 339* may be taken after completing any full-year course in calculus although a course in linear algebra is recommended.
3. Under certain conditions some substitutions in the required 100- and 200-level courses may be permitted:
 - a. Students in the following concentrations are permitted to take either STAT 263*, 351* or STAT 263*, 268* in place of STAT 268*, 269*:
 - i. the minor or general concentration in statistics
 - ii. the medial concentration in mathematics or statistics
 - b. Students in some concentrations will be allowed to substitute MATH 111 for 110; MATH 121 or 122 for 120; MATH 221* for 280*.

Students should be aware that making one or more of these substitutions may result in not having the prerequisites for some upper-year courses and hence having limited choices in years three and four.

4. Substitutions that are not allowed:
 - a. Students in the major concentration in statistics must take STAT 269* and one of STAT 268*, 351* and may not take STAT 263* in place of STAT 269*
 - b. Students in the major concentration in mathematics must take MATH 231*, 281* and may not replace MATH 231* by 232*
5. The six required 200-level courses prescribed for the major concentration in mathematics need not all be taken in the second year. For instance, a student who wishes to study mathematics and physics should consider taking physics courses in the the second year and deferring STAT 268* and 269* to the third year. As a second example, a student who wishes to study mathematics and economics should consider taking courses in economics in the second year and deferring MATH 210* and possibly 231* to the third year.

6. The mathematical physics concentration (which is jointly administered with physics) will continue in the foreseeable future and students may enrol in it.
7. A new mathematical biology concentration (to be jointly administered with biology) has been approved and students will no longer be allowed to enter the BSCH medial concentration in biology and mathematics. Students already enrolled in this medial concentration may continue in it or change to the new concentration.

The course requirements for this concentration are:

(a) Mathematics courses:

MATH 110 or MATH 111
MATH 120 or MATH 121 or MATH 122
MATH 221* or MATH 280*
MATH 231* or MATH 232*
STAT 268* or STAT 351*
BIOL 243* or STAT 269*
BIOM 300* and MATH 339*

and an additional 12.0 units from MATH or STAT courses
with at least 6.0 of these units numbered 300 or above

(b) Biology courses

BIOM 102* and BIOL 103*
BIOL 201* and BIOL 202* and BIOL 205* and BIOL 206*
BIOL 302* or BIOL 303*
BIOL 339* or BIOL 341*
BIOL 330* or MBIOL 218*

and an additional 9.0 units from BIOL courses with at least
6.0 of these units numbered 300 or above

Note that both BIOM 300* and MATH 339* are required for this program and that the department teaches these two courses in alternate years, and so students in this program will need to take one of these courses in third year and the other in fourth year.

The following 200-level courses will be offered in 2011/12:

- Fall term courses
 - MATH 221* Vector Calculus
 - MATH 231* Differential Equations
 - MATH 280* Advanced Calculus
 - STAT 263* Introduction to Statistics
 - STAT 268* Statistics and Probability I

- Winter term courses
 - MATH 210* Rings and Fields
 - MATH 232* Differential Equations
 - MATH 281* Introduction to Real Analysis
 - STAT 263* Introduction to Statistics
 - STAT 269* Statistics and Probability II

- Full-year course:
 - MATH 211

Note that MATH 211 will likely not be offered in 2012/13

Degree programs with a concentration in mathematics or statistics:

The department has fourteen degree programs and their designations in the current calendar and in next year's calendar are

Old designation	New designation	Name
BA MIN MATH	MATH-G-BA	BA General Math
BA MIN MATH	MATH-Y	BA Minor Math
BA MIN STAT	STAT-G-BA	BA General Stat
BA MIN STAT	STAT-Y	BA Minor Stat
BSC GEN MATH	MATH-G-BSC	BSC General Math
BSC GEN MATH	MATH-Z	BSC Minor Math
BSC GEN STAT	STAT-G-BSC	BSC General Stat
BSC GEN STAT	STAT-Z	BSC Minor Stat
BAH MED MATH XXXX	MATHXXXX-A-BAH	BAH Medial Math XXXX
BAH MED XXXX MATH	XXXXMATH-A-BAH	BAH Medial XXXX Math
BAH MED STAT XXXX	STATXXXX-A-BAH	BAH Medial Stat XXXX
BAH MED XXXX STAT	XXXXSTAT-A-BAH	BAH Medial XXXX Stat
BSCH MAJ MATH	MATH-M-BSH	BSH Major Math
BSCH MAJ STAT	STAT-M-BSH	BSH Major Stat
BSCH SSP MAPH	MAPH-P-BSH	BSH SSP Maph
(new program)	BIMA-P-BSH	BSH SSP Bima

In this table XXXX denotes another department and the two departments in question will appear in alphabetical order, and hence the two entries for BAH mathematics and the two for BAH statistics medial.

The General degrees (designated by '-G-BA' and '-G-BSC') are stand alone degrees whereas the Minor degrees (designated by '-Y' and '-Z') must be combined with a a major from another department.

BA General or Minor in Mathematics

- number of MATH, STAT, or BIOM units required: 30
- total number of units required: 90
- usual 100- and 200-level MATH or STAT courses: 111, 121 or 122, 263*
- other recommended MATH or STAT courses: 211, 221*, 232*
- the minor must be combined with a major in another department
- the general requires a further 18 units from one or more science departments

BA General or Minor in Statistics

- number of MATH, STAT, or BIOM units required: 30
- total number of units required: 90
- usual 100- and 200-level MATH or STAT courses: 111 or 112*, 121 or 122, 221*, 268*, 269*
- other recommended MATH or STAT courses: 211, 232*, 337*, 361*, 464*
- the minor must be combined with a major in another department
- the general requires a further 18 units from one or more science departments

BAH Medial in Mathematics

- must be combined with an arts, a social science, or a humanities medial concentration
- number of MATH, STAT, or BIOM units required: 42
- total number of units required: 114
- usual 100- and 200-level MATH or STAT courses: 110 (or 111), 120 (or 121 or 122), 211 (or 210*), 231* or 232*, 280* (or 221*), 268*, 269*

BAH Medial in Statistics

- must be combined with an arts, a social science, or a humanities medial concentration
- number of MATH, STAT, or BIOM units required: 42
- total number of units required: 114
- usual 100- and 200-level MATH or STAT courses: 110 (or 111), 120 (or 121 or 122), 280* (or 221*), 268*, 269*

BSH Major in Mathematics

- number of MATH, STAT, or BIOM units required: 60
- total number of units required: 120
- usual 100- and 200-level MATH or STAT courses: 110, 120, 210*, 231*, 268*, 269*, 280*, 281*
- the 200-level courses need not all be taken in second year

BSH Major in Statistics

- number of MATH, STAT, or BIOM units required: 60
- total number of units required: 120
- usual 100- and 200-level MATH or STAT courses: 110, 120, 268*, 269*, 280*, 281*

BSH in Mathematical Physics

- number of MATH, STAT, or BIOM units required: 60
- total number of units required: 120
- usual 100- and 200-level MATH or STAT courses: 110, 120, 268*, 269*, 280*, 281* (with no substitutions allowed for 268* and 269*)

BSH in Mathematical Biology

- number of MATH, STAT, BIOM, or BIOL units required: 84
- total number of units required: 120
- required courses are listed on 3

Statistics as a Subject and a Career

What is Statistics?

- The entire science of decision making in the face of uncertainty (Freund and Walpole).
- A branch of mathematics dealing with the collection, analysis, interpretation and presentation of masses of numerical data (Webster's New Collegiate Dictionary).

What do statisticians do?

- Design surveys and experiments to collect trustworthy data.
- Analyze the data to make their meaning clear.
- Draw practical conclusion based on statistical analysis and provide useful guidance.
- Job titles

Statistician	SAS programmer
Data analyst/ statistical analyst	Methodologist
Biostatistician	Risk analyst
Financial analyst	Actuary

- Industries that employ statisticians
 - Business and industry: agriculture, chemistry, computer science, economics, engineering, finance, manufacturing, marketing, quality improvement, reliability
 - Health and medicine: animal health, clinical trials, epidemiology, genetics, pharmacology, public health
 - Government: census, ecology, forestry, government regulation, law, national defense, population research, risk assessment, surveys.

- Sample employers
 - Google, Capital one, J.P. Morgan, Merck, P&G, Johnson & Johnson, Pfizer, Westat, SAS, Instightful, SPSS, Yahoo, Microsoft, IBM, Rand, Travelers, GlaxoSmithKline
 - Statistics Canada, BC cancer center, Health Canada, Canadian institute for health information, Syreon Corporation, Manulife Financial, Capital health, HSBC

Difference between mathematics and statistics

- Not only one answer
- Not just formulas or numbers
- Deal with messy data in different contexts
- Different interpretations depending on different assumptions

Second-year statistics courses

- STAT 263: Introduction to Statistics
- STAT 268: Statistics and Probability I
- STAT 269: Statistics and Probability II

Skills to be developed

- Think statistically
- Statistical data analysis
- Computing skills
- Writing skills
- Communication skills