Faculty of Arts and Science
Department of Mathematics and Statistics

Advice for students in year 3 and 4 in 2011/12

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This is an updated version of the information that was given at the meeting last March and subsequently posted on the department's web page. The changes that have been made are:

(i) Professor Geramita will teach MATH 310

(ii) Professor Smith will teach MATH 401

(iii) MATH 337 and 339 have been moved to the Winter term

(iv) MATH 406 (Introduction to Coding Theory) will be offered by Professor Thind in the Winter term.

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 in Jeffery Hall and asking for him.

2. The courses that we are planning to teach in the 2011/12 academic year and the instructors for some of them are listed on page 5. Please keep in mind that

   - the instructors may change,
   - courses with low enrolments may be cancelled, and
   - other unforeseen changes may have to be made.

3. Students in the following programs are permitted to take STAT 263*, 351* or STAT 263*, 268* in place of STAT 268*, 269*

   a. the minor or general concentration in statistics

   b. the medial concentration in mathematics or statistics

   Students should be aware that these substitutions may result in their not having the prerequisites for some upper-year STAT courses and hence having limited choices in years three and four. This has been a problem for a few students in the major concentration in mathematics.

4. Substitutions that are <u>not</u> 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. A little over a year ago STAT 363* was renumbered to become STAT 463* and there may still be references to the former in the calendar or on the department web pages. The old STAT 363* and the current STAT 463* are identical and students in third year who are interested in statistics should consider this course.

6. Students taking the major concentration in mathematics are required to select their 300- and 400-level courses in accordance with one of the foci listed in the calendar. For convenience, these foci as they will appear in the 2011/12 calendar are listed on page 6. Students in third year should largely ignore this requirement and take the courses they would like to take, and students entering fourth year should select courses with this requirement in mind.

7. The BSCH medial concentration in biology and mathematics is being phased out and will be replaced by a new BSCH SSP concentration in biology and mathematics. No students will be accepted into the medial concentration and students already in this concentration may continue in it or change to the new concentration. The mathematics and statistics course requirements for the new SSP concentration in biology and mathematics are:

   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

8. Some courses are offered in alternate years. The following courses will be offered in 2011/12 subject to sufficient enrolment and will probably not be offered in 2012/13:

   MATH 310*, 337*, 339*, 381*, 382*, 387*, 414*, 418*, 427*, 436*
   STAT 464*, 471*.

   And, correspondingly, we do not plan to offer the following courses in 2011/12 but will likely offer most of them in 2012/13:

   BIOM 300*, MATH 311*, 341*, 402*, 413*, 421*, 481*
   STAT 473*.

300- and 400-level courses to be taught 2011/12:

Number	Title	Term	Instructor
MATH 310	Group Theory	F	Geramita
MATH 326	Functions of a Complex Variable	F	Yui
MATH 334	Mathematical Methods for Engineering and Physics	F	Lewis
MATH 338	Topics in Applied Mathematics	F	Bogoyavlenskij
MATH 381	Mathematics with a Historical Perspective	F	Orzech
MATH 382	Mathematical Explorations	F	Taylor
MATH 384	Mathematical Theory of Interest	F	
STAT 351	Probability I	F	Linder
STAT 361	Applied Methods in Statistics I	F	Levit
MATH 401	Graph Theory	F	Smith
MATH 418	Number Theory and Cryptography	F	Kani
MATH 430	Modern Control Theory	F	Mansouri
MATH 474	Information Theory	F	Alajaji
MATH 497	Modular Forms	F	Murty
STAT 455	Stochastic Processes and Applications	F	Yuksel
STAT 462	Computational Data Analysis	F	
STAT 464	Discrete Time Series Analysis	F	Moghtaderi
MATH 312	Linear Algebra	W	
MATH 328	Real Analysis	W	Bogoyavlenskij
MATH 332	Introduction to Control	W	Mansouri
MATH 335	Mathematics of Engineering Systems	W	Yuksel
MATH 337	Introduction to Operations Research Models	F	Ableson
MATH 339	Evolutionary Game Theory	F	
MATH 385	Life Contingencies	W	
MATH 387	Elementary Geometry - an Advanced Perspective	W	
STAT 353	Probability II	W	Linder
MATH 406	Introduction to Coding Theory	W	Thind
MATH 414	Introduction to Galois Theory	W	Yui
MATH 427	Introduction to Deterministic Dynamical Systems	W	Offin
MATH 436	Partial Differential Equations	W	Bogoyavlenskij
MATH 439	Lagrangian Mechanics, Dynamics, and Control	W	Lewis
MATH 472	Control of Stochastic Systems	W	Yuksel
MATH 477	Source Coding and Quantization	W	Linder
STAT 463	Fundamentals of Statistical Inference	W	Lin
STAT 471	Design and Analysis of Experiments	W	Lin
STAT 486	Survival Analysis	W	Jiang

Foci for students doing a major in mathematics:
The program for Years 3 and 4 must include a focused group of courses chosen from one of the following lists. In planning their program students should consider that many of the 400-level courses listed are not offered every year, but can be taken in third year. The graduate courses MATH 844*, 891*, 892*, 893*, 894*, 895*, and 896* may be taken by fourth-year students with an excellent record and with the permission of the instructor and the undergraduate chair.

ACTUARIAL FOCUS: MATH 384*, 385*; STAT 353*, 361*; at least 12.0 units chosen from MATH 337*, 434*, STAT 463*, 455*, 462*, 464*, 465*; an additional 9.0 units chosen from COMM 211* (or 111*), 221* (or 121*), ECON 110, 212*, MATH 272*.

BIOMATHEMATICS FOCUS: BIOM 300*; at least 6.0 units chosen from MATH 337*, 427*, 432*, 434*, STAT 455*.

BUSINESS FOCUS: MATH 337*, 394*; STAT 361* and/or 463*; at least 6.0 units chosen from MATH 401*, 434*, STAT 353*, 455*, 464*, 465*.

COMMUNICATIONS FOCUS: MATH 312*, 328*; STAT 455*; at least 9.0 units chosen from MATH 406*, 419*, 474*, 477* and 484*.

DISCRETE MATHEMATICS AND OPTIMIZATION FOCUS: MATH 312*; at least 12.0 units chosen from STAT 353*, MATH 401*, 402*, 405*, 406*, 434*.

DYNAMIC PROCESSES FOCUS: MATH 326*, 328*; at least 6.0 units chosen from STAT 353*, MATH 427*, 432*, 441*.

PROBABILITY FOCUS: MATH 328*; STAT 353*, 463*, 455*; at least one of MATH 474*, 484*.

PURE MATHEMATICS FOCUS: MATH 310*, MATH 326*, MATH 328*, and 6.0 units from MATH 341*, MATH 401*, MATH 413*, MATH 414*, MATH 421*.

STATISTICS FOCUS: STAT 361*, 463*; at least 6.0 units chosen from STAT 460*, 462*, 464*, 465*, 466*, 486*.

TEACHING FOCUS: At least 9.0 units chosen from MATH 311*, 313*, 381*, 382*, 386*, 387*.

(Note that in the future one-term courses will be worth 3.0 units.)

MATH 497 - Fall 2011
Modular Forms - Professor Murty

Introduction to modular forms Modular forms play a central role in number theory, algebraic geometry, representation theory and combinatorics. This course will be an introduction to this important subject. Some knowledge of complex analysis will be helpful but not essential. However, a solid background in linear algebra is a definite prerequisite.

The text will the recent book by William Stein, *Modular Forms, A computational Approach*.

Information on Courses and Careers in Statistics

1. Courses

Course	Name	Semester
351	Probability I	Fall
353	Probability II	Winter
361	Applied methods in statistics I	Fall
455	Stochastic process and application	Fall
462	Computational data analysis	Fall
463	Fundamentals of statistical inference	Winter
464	Time series analysis	Winter
471	Design and analysis of experiments	Winter
473	Generalized linear models	Winter
486	Survival analysis	Winter

Third year: 351, 353, 361, 463, 462, 471
Fourth year: 455, 464, 473, 486

2. Graduate program

- Graduate in Statistics
- Collaborative M.Sc. program in Biostatistics

3. Career in Statistics

What do statistician 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

Career titles

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

Industries 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, GlaxoSimithKline
- Statistics Canada, BC cancer center, Health Canada, Canadian institute for health information, Syreon Corporation, Manulife Financial, Capital health, HSBC

Resources

`http://www.ssc.ca/jobs/e`
`http://www.amstat.org/careers/index.cfm`
`http://www.math-jobs.com/`