Mathematics, Applications of: Bachelor of Science Honours, Major, and Minor

Faculty of Science and Horticulture	kpu.ca/science
Implementation Date	01-Sep-2014
Start Date(s)	September January May
Admission Type	Selective entry
Enrolment Type	Open enrolment
Program Type	Undergraduate
Credential Granted	Baccalaureate Degree
Offered At	Richmond Surrey
Format	Option not set
How to Apply	www.kpu.ca/admission

DESCRIPTION

In the BSc in Applications of Mathematics program, traditional mathematics courses are combined with specialized courses that enable students to apply their mathematical skills in diverse fields, providing a broad range of options for careers or further education. Students can choose from among three concentrations, Biomathematics, Computational Mathematics and Mathematics Education, that are not readily available at the undergraduate level elsewhere in Canada.

Please note, courses in Years 2, 3, and 4 may not be available on the Richmond campus.

PROGRAM ADMISSION REQUIREMENTS

In addition to KPU's General university admission requirements, including the undergraduate-level English Proficiency Requirement, the following program admission requirements apply:

- English 12 with a 'B' (or equivalent)
- Chemistry 11 with a 'C+' (or equivalent)
- Physics 12 with a 'C-' (or equivalent)
- Precalculus 12 with a 'C+' (or equivalent)

Note: a pre-requisite of Chemistry 12 with a 'C+' is required for students pursuing the Biomathematics specialization.

PROGRAM REQUIREMENTS

General Requirements

All students must complete the following general requirements for a Bachelor of Science:

- A minimum of 120 credits and a minimum of 40 courses (at least 3 credits each) at the post-secondary level (numbered 1100 or higher).
- At least 45 of the credits (15 courses) must be at the 3000- or 4000-level; at least 9 of these credits must be at the 4000-level.
- A minimum of 18 credits of breadth electives (see Electives) including:
  - at least one 3000- or 4000-level course; and
  - at least 12 credits from fields or courses not regarded as science; and
  - a maximum of 6 credits may come from fields of science not already included in the Applications of Mathematics Major requirements.
- A minimum of a passing grade (D or better) in all courses counting towards the BSc, with a cumulative GPA of 2.0.

To meet residency requirements, at least 50% of all courses for the BSc, and at least 66% of upper level courses for the BSc, must be completed at KPU.

Note: The following courses with considerable content overlap may only be counted once:

- (MATH 1120 or MATH 1130 or MATH 1140),
- (MATH 1220 or MATH 1230 or MATH 1240),
- (MATH 2321 or MATH 2821),
- (MATH 2335 or MATH 2341 or BUQU 1230),
- (MATH 1152 or MATH 2721),
- (BIOL 1112 or BIOL 1210),
- (ENVI 1106 or CHEM 1110),
- (ENVI 1206 or CHEM 1154 or CHEM 1210),
- (CHEM 3310 or CHEM 2311 or CHEM 2310),
- (PHYS 1101 or PHYS 1120),
- (PHYS 1102 or PHYS 1220)

Applications of Mathematics Honours

In addition to the requirements listed for Applications of Mathematics Major shown below, Honours students will need to select a total of at least 36 credits from List A (see below).

Students must complete 132 credits overall and maintain a Cumulative Grade Point Average (CGPA) of 3.0 and a minimum GPA of 3.0 in all upper division Mathematics courses.

To qualify for the Applications in Mathematics Honours degree, students must have been admitted to the Honours program prior to earning the Applications in Mathematics degree. Students may receive either the Applications in Mathematics degree or the Applications in Mathematics Honours degree, but not both.

Applications of Mathematics Major

In addition to the Core Requirements, students must complete the requirements of one of the concentrations in order to complete the Major program.

CORE REQUIREMENTS (FOR ALL CONCENTRATIONS)

All of:

ENGL 1100	Introduction to University Writing	3 credits

Year 1 and 2

One of:

MATH 1120	Differential Calculus	3 credits

MATH 1110	Calculus for the Life Sciences I	3 credits
MATH 1180	Calculus I (Business Applications)	3 credits

And one of:

MATH 1220	Integral Calculus	3 credits
MATH 1130	Calculus for the Life Sciences II	3 credits

And all of:

CPSC 1103	Introduction to Computer Programming I	3 credits
MATH 2232	Linear Algebra	3 credits
MATH 2315	Probability and Statistics	3 credits
MATH 2221	Multivariate Calculus (Calculus III)	3 credits
MATH 2410	Discrete Mathematics	3 credits

Year 3 and 4

All of:

MATH 3120	Introduction to Applied Mathematics	3 credits
MATH 3315	Inferential Statistics	3 credits
MATH 3421	Ordinary Differential Equations	3 credits
MATH 4240	Mathematical Modelling	3 credits

Notes:

- ASTR 1100, ASTR 1105, ASTR 3110, ASTR 3111, ENVI 3112, ENVI 2405, MATH 1115, MATH 1116, MATH 1117, MATH 1190 and PHYS 1112 cannot be counted as science credits unless included in the concentration requirements; however they may be used as elective credits.
- CHEM 1101 cannot be used either as science or elective credits.
- BIOL 1112, CHEM 1105, MATH 1112, and PHYS 1100 cannot be counted as science or elective credits unless included in the concentration requirements.

BIOMATHEMATICS CONCENTRATION

Additional requirements (over and above the core requirements).

Year 1 and 2

All of:

BIOL 1110	Introductory Biology I	4 credits
BIOL 1210	Introductory Biology II	4 credits
BIOL 2322	Ecology	4 credits
CHEM 1110	The Structure of Matter	4 credits
CPSC 1204	Introduction to Computer Programming II	3 credits
One additional course that meets the writing requirement		3 credits

And one of:

BIOL 2320	Genetics	4 credits
BIOL 2321	Cell Biology	4 credits

And one of:

PHYS 1101	Physics for Life Sciences I	4 credits
PHYS 1120	Physics for Physical and Applied Sciences I	4 credits

Year 3 and 4

All of:

MATH 3140	Mathematical Computing	3 credits
MATH 4210	Biomathematics	3 credits
MATH 4350	Senior project	3 credits

And students must also complete:

- Three additional MATH courses (at least one at the 4000 level) chosen from List A (see below).
- Three more Biology courses numbered 2000 and above, including at least one at the 3000 or 4000 level. Conservation Biology and Molecular Genetics recommended.

COMPUTATIONAL MATHEMATICS CONCENTRATION

Additional requirements (over and above the core requirements).

Year 1 and 2

All of:

CPSC 1204	Introduction to Computer Programming II	3 credits
CPSC 2302	Data Structures and Program Organization	3 credits
CHEM 1110	The Structure of Matter	4 credits
One additional course that meets the writing requirement		3 credits

And one of:

MATH 2331	Introduction to Analysis	3 credits
MATH 3150	The Structure of Mathematics	3 credits

And one of:

PHYS 1101	Physics for Life Sciences I	4 credits

PHYS 1120	Physics for Physical and Applied Sciences I	4 credits

Year 3 and 4

All of:

CPSC 3110	Simulation	3 credits
MATH 3140	Mathematical Computing	3 credits
MATH 4350	Senior Project	3 credits

And students must also complete:

- Three additional MATH courses chosen from List A (see below).
- At least seven more science or mathematics credits, four of which must be a lab-based BIOL, CHEM, or PHYS course.

It is recommended that students choose sufficient electives from the physical sciences (Physics

and Chemistry), computer science, or economics and business to provide expertise in an area of

application.

MATHEMATICS EDUCATION CONCENTRATION

Additional requirements (over and above the core requirements).

Year 1 and 2

All of:

BIOL 1110	Introductory Biology I	4 credits
EDUC 2220	Introduction to Educational Psychology	3 credits
MATH 2331	Introduction to Analysis	3 credits

And one of:

ENGL 1202	Reading and Writing about Selected Topics: An Introduction to Literature	3 credits
ENGL 1204	Reading and Writing about Genre: An Introduction to Literature	3 credits

And one of:

PHYS 1101	Physics for Life Sciences I	4 credits
PHYS 1120	Physics for Physical and Applied Sciences I	4 credits

And one of:

PHYS 1102	Physics for Life Sciences II	4 credits
PHYS 1220	Physics for Physical and Applied Sciences II	4 credits

And one of:

CHEM 1105	Introductory Chemistry	4 credits
CHEM 1110	The Structure of Matter	4 credits
CPSC 1204	Introduction to Computer Programming II	3 credits
MATH 1116	Mathematical Explorations	3 credits

Year 3 and 4

All of:

MATH 3130	Introduction to the Mathematics Classroom	3 credits
MATH 3150	The Structure of Mathematics	3 credits
MATH 3250	Geometry	3 credits
MATH 3322	Vector Calculus (Calculus IV)	3 credits
MATH 3450	History of Mathematics	3 credits
MATH 4130	Theory of Mathematics Education	3 credits

And five additional courses (at least two MATH, one of which must be 4th year) chosen from List A (see below) and/or:

EDUC 3210	Supportive Relations in Educational Settings	3 credits
EDUC 3220	Children's Social and Emotional Development in Educational Settings	3 credits
EDUC 3250	Assessment Practices in Education	3 credits
EDUC 4210	Best Practices in Educational Settings	3 credits
PSYC 3303	Learning: Theory and Practice	3 credits

It is recommended that students wishing to teach secondary level mathematics also prepare in a second teachable area. This would consist of 30 credits of coursework, 18 of which should be at the 3rd or 4th year.

Applications of Mathematics Minor

In order to complete the Minor program, students must complete the following requirements:

Year 1 and 2

One of:

MATH 1120	Differential Calculus	3 credits
MATH 1130	Calculus for Life Sciences I	3 credits
MATH 1140	Calculus I (Business Applications)	3 credits

And one of:

MATH 1220	Integral Calculus	3 credits
MATH 1230	Calculus for Life Sciences II	3 credits

And one of:

MATH 2315	Probability and Statistics	3 credits
MATH 2335	Statistics for Life Sciences	3 credits
MATH 2341	Introduction to Statistics for Business	4 credits

And all of:

MATH 2232	Linear Algebra	3 credits

MATH 2321	Multivariate Calculus (Calculus III)	3 credits

Year 3 and 4

15 credits:

chosen from List A (see below).	15 credits

List A - Selected Mathematics Courses

MATH 3120	Introduction to Applied Mathematics	3 credits
MATH 3140	Mathematical Computing	3 credits
MATH 3150	The Structure of Mathematics	3 credits
MATH 3160	Group Theory	3 credits
MATH 3170	Complex Variables	3 credits
MATH 3250	Geometry	3 credits
MATH 3315	Inferential Statistics	3 credits
MATH 3322	Vector Calculus (Calculus IV)	3 credits
MATH 3421	Ordinary Differential Equations	3 credits
MATH 3431	Partial Differential Equations	3 credits
MATH 3450	History of Mathematics	3 credits
MATH 4150	Number Theory	3 credits
MATH 4190	Introduction to Point-Set Topology	3 credits
MATH 4210	Biomathematics	3 credits
MATH 4220	Numerical Methods	3 credits
MATH 4240	Mathematical Modelling	3 credits
MATH 4250	Special Topics in Mathematics	3 credits
MATH 4350	Senior Project	3 credits

CREDENTIAL AWARDED

Upon successful completion of the honours program, students are eligible to receive a **Bachelor of Science (Honours)**. Transcripts will indicate **Major in Applications of Mathematics**.

Upon successful completion of the major program students are eligible to receive a **Bachelor of Science**. Transcripts will indicate a **Major in Applications of Mathematics**.

Upon successful completion of the minor as part of a Bachelor of Science program, transcripts will indicate a **Minor in Applications of Mathematics**.