COMPUTING, MATHEMATICS AND ANALYTICS – SPECIALIZATION (COMPUTING) – BACHELOR OF COMPUTING (HONOURS)

COMA-P-BCH (Computing, Mathematics and Analytics)
COMA-I-BCH (Computing, Mathematics and Analytics with Professional Internship)

Subject: Administered by the School of Computing and the Department of Mathematics and Statistics.
Plan: Consists of 84.00 units as described below.
Program: The Plan, with sufficient electives to total 120.00 units, will lead to a Bachelor of Computing (Honours) Degree.

Note: Requirements for this program have been modified. Please consult the 2022-2023 (https://www.queensu.ca/academic-calendar/archive/2022-2023/arts-science/)*Calendar* for the previous requirements.

Code	Title	Units
1. Core		
– COMPUTING –		
A. Complete the following:		
CISC 121	Introduction to Computing Science I	3.00
CISC 124	Introduction to Computing Science II	3.00
B. Complete the following:		
CISC 203	Discrete Mathematics for Computing II	3.00
CISC 204	Logic for Computing Science	3.00
CISC 221	Computer Architecture	3.00
CISC 223	Software Specifications	3.00
CISC 235	Data Structures	3.00
C. Complete 3.00 units from the following:		**3.00**
CISC 322	Software Architecture	
CISC 326	Game Architecture	
D. Complete the following:		
CISC 324	Operating Systems	3.00
CISC 360	Programming Paradigms	3.00
CISC 365	Algorithms I	3.00
E. Complete the following:		
CISC 497	Social, Ethical and Legal Issues in Computing	3.00
F. Complete 3.00 units from the following:		**3.00**
CISC 495	Software Evolution	
CISC 499	Advanced Undergraduate Project	
CISC 500	Undergraduate Thesis	
– MATHEMATICS AND STATISTICS –		
G. Complete 6.00 units from the following:		**6.00**
MATH 110	Linear Algebra	
CISC 102 & MATH 111	Discrete Mathematics for Computing I and Linear Algebra	
H. Complete 6.00 from the following:		**6.00**
MATH 120	Differential and Integral Calculus	
MATH 121	Differential and Integral Calculus	
MATH 123 & MATH 124	Differential and Integral Calculus I and Differential and Integral Calculus II	
I. Complete 6.00 units from the following:		**6.00**
MATH 210	Rings and Fields	
MATH 211	Algebraic Methods	
MATH 310	Group Theory	
MATH 311	Elementary Number Theory	
MATH 413	Introduction to Algebraic Geometry	
MATH 414	Introduction to Galois Theory	
J. Complete 3.00 units from the following:		**3.00**
MATH 221	Vector Calculus	
MATH 280	Advanced Calculus	
K. Complete the following:		
STAT 269	Statistics and Probability II	3.00
STAT 361	Applied Methods in Statistics I	3.00
STAT 463	Fundamentals of Statistical Inference	3.00
L. Complete 3.00 units from following:		**3.00**
STAT 252	Introductory Applied Probability	
STAT 268	Statistics and Probability I	
STAT 351	Probability I	
2. Option		
A. Complete 12.00 units from the following course list		**12.00**
COMA_Options		
Electives		
Elective Courses		36.00
Total Units		**120.00**

3. Substitutions

A. Students in the internship version of this Plan will substitute 3.00 units from COMP at the 300-level for requirement **1.F.** (CISC 499). In addition, the B.Cmp.(Hons.) Program requirements will be increased by 6.00 units from COMP at the 300-level, for a total of 126.00 units if the student is taking a 12-month internship, or by 9.00 units

from COMP at the 300-level, for a total of 129.00 units if the student is taking a 16-month internship.

4. Notes

A. Students with no programming experience should review the Introductory Courses (https://www.queensu.ca/academic-calendar/arts-science/schools-departments-programs/computing/) paragraph included on the School of Computing overview page in the *Calendar.*

B. Students should select some of their option courses to be focused in a particular area; the following is a list of suggested areas:

i. Communications and Coding: MATH 401; MATH 406; MATH 418; MATH 474; MATH 477.

ii. Data Analysis: CISC 271; CISC 371; CISC 372; CISC 473; STAT 361; STAT 456; STAT 457; STAT 462; STAT 463; STAT 464; STAT 471; STAT 473; STAT 486.

iii. Theory in Computer Science: CISC 422; CISC 462; CISC 465; CISC 467; MATH 401; MATH 402; MATH 418.

iv. Discrete Math and Optimization:MATH 337; MATH 401; MATH 402.

C. Students may seek approval for a modified selection of courses for COMA_Options; a written rationale is required.

D. Students interested in pursuing graduate studies in mathematics should take additional mathematics courses.

E. Some CISC, MATH, STAT, and BIOM option courses are offered only in alternate years. The courses to be offered each year are announced on the departmental websites before the course selection period, and students should refer to that information in planning their course selections.

F. With the approval of the Undergraduate Chair, students who take CISC 500 working on a project directly related to Computing, Mathematics, or Analytics may count 3.00 units towards COMA_Options.

G. A maximum of 6.00 units from courses offered by other Faculties and Schools may be counted toward the program and/or Plan requirements. This includes courses in BMED, COMM, GLPH, HSCI, LAW, NURS, and courses in the Faculty of Engineering and Applied Science.

Computing and Mathematics Course List

The following list contains courses offered through other Departments. In accordance with Academic Regulation **2.6** (Access to Classes), students do not have enrolment priority in all of these courses. Access to these courses may only be made available during the Open Enrolment period, and then only if space permits.

COMA_Options

Code	Title	Units
Courses in other departments usable as COMA options		
BIOM 300	Modeling Techniques in Biology	3.00
CISC 271	Linear Data Analysis	3.00
CISC 330	Computer-Integrated Surgery	3.00
CISC 371	Nonlinear Data Analysis	3.00
CISC 372	Advanced Data Analytics	3.00
CISC 422	Formal Methods in Software Engineering	3.00
CISC 455	Evolutionary Optimization and Learning	3.00
CISC 457	Image Processing and Computer	3.00
CISC 462	Computability and Complexity	3.00
CISC 465	Semantics of Programming Languages	3.00
CISC 467	Fuzzy Logic	3.00
CISC 472	Medical Informatics	3.00
CISC 473	Deep Learning	3.00
CISC 500	Undergraduate Thesis	6.00
MATH 337	Stochastic Models in Operations Research	3.00
MATH 339	Evolutionary Game Theory	3.00
MATH 401	Graph Theory	3.00
MATH 402	Enumerative Combinatorics	3.00
MATH 406	Introduction to Coding Theory	3.00
MATH 413	Introduction to Algebraic Geometry	3.00
MATH 414	Introduction to Galois Theory	3.00
MATH 418	Number Theory and Cryptography	3.00
MATH 474	Information Theory	3.00
MATH 477	Data Compression and Source Coding: Theory and Algorithms	3.00
STAT 361	Applied Methods in Statistics I	3.00
STAT 456	Bayesian Analysis	3.00
STAT 457	Statistical Learning II	3.00
STAT 462	Statistical Learning I	3.00
STAT 463	Fundamentals of Statistical Inference	3.00
STAT 464	Discrete Time Series Analysis	3.00
STAT 471	Sampling and Experimental Design	3.00
STAT 473	Generalized Linear Models	3.00
STAT 486	Survival Analysis	3.00