

Clarkson

DEPARTMENT OF MATHEMATICS

Undergraduate Student Handbook

Class of 2029 and Beyond

Fall 2025



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Department of Mathematics
Class of 2029 and beyond

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This handbook has been prepared for advising purposes. It contains detailed requirements and advice for students majoring in **Mathematics**, **Applied Mathematics and Statistics**, or **Data Science**. It also contains detailed requirements and advice for students minoring in **Mathematics**, **Statistics**, or **Computational Science**. The current version of this handbook can be found online at the Mathematics Department website.

Note that the Clarkson Catalog and the Clarkson Regulations remain the official references.

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1 Overview of Mathematics Programs

The Department of Mathematics offers three majors (which cannot be combined with each other for a double or triple major):

Mathematics (MA) Major:

Mathematics is the study of numbers, functions, geometrical forms, and abstract logical structures and their associated relationships. In addition to providing an essential foundation for scientific and technical fields, mathematics is studied both for its own intellectual appeal and challenge and for its application to real-life problems. Students of mathematics also develop critical thinking and analytical skills useful for a wide variety of careers.

The major in Mathematics is designed for students whose primary interest is mathematics or statistics, and is good preparation either for careers in those fields or for graduate study. Students pursuing this major choose one of two options, which differ primarily in the upper-division courses they emphasize:

- *Math Option:* Prepares students for careers in mathematics or for graduate school in mathematics, applied mathematics, or related fields.
- *Statistics Option:* Prepares students for careers as statisticians or actuaries or for graduate school in statistics.

Applied Mathematics and Statistics (AM&S) Major:

Applied mathematics is a problem-solving profession. Mathematical and statistical methods provide the tools for the analysis and solution of real-world problems which can be formulated quantitatively.

The major in Applied Mathematics and Statistics is designed for students who wish to develop their mathematical skills and apply them to solve challenging problems in science, engineering, or business. This major has less emphasis on abstract mathematics and proof than does the MA major. In addition to a broad base of applied mathematics courses, students choose applications electives in their areas of interest.

Data Science (DS) Major:

Across business, industry, government, and nearly all scientific efforts, the explosion of data and data collection drives a growing need to manage, analyze, and extract insight and knowledge from the data produced. Not only must scientists and engineers grapple with the vast volumes of data, but throughout business and industry the ability to reason effectively using data continues to grow in importance. The skillset required to excel in that environment lies at the intersection of math, statistics, and computational science. The emerging discipline of Data Science addresses that interdisciplinary space.

The major in Data Science provides students the opportunity to develop an interdisciplinary, data-focused skillset and then apply those skills to real-world challenges. The program provides strong preparation in critical aspects of working with data by thorough grounding in mathematics and statistics and the foundations of computer science as related to data and data processing. The program provides early focus on foundational competencies across the spectrum of science of data. Once that baseline is established, the students are expected to apply those skills to in specific domains of interest to the student, with a significant component of the curriculum based on team projects and experiential learning.

Other programs administered by the department:

- Minor in Data Science
- Minor in Mathematics
- Minor in Statistics
- Minor in Computational Science

The department also administers graduate programs leading to the M.S. and Ph.D. degrees in Mathematics. For information, contact the department office or visit the department website.

2 Academic Opportunities

As you plan your program of study, keep in mind the following considerations and special programs.

Free Electives. All majors in the Mathematics Department include a large number of free electives. You are strongly encouraged to use these electives in a meaningful way. While you can use some of your free electives to take additional courses in your major, many students use some of their free electives to earn either a minor or a second major. This second discipline can be closely related to your major or it can be a discipline in which you have a strong personal or professional interest.

Double Majors. Many students in the department graduate having satisfied the requirements for two different majors. Mathematics and Computer Science is a common combination; other popular second majors include Physics, Biology, and Business. Doubling with an engineering major usually requires overloading. See your advisor and the Chair of the second department. Sample programs for several common double majors are at the end of this booklet. These are only samples, so you must verify your program with both major departments in advance.

Dual Degrees. A dual degree (the simultaneous awarding of two B.S. degrees) is like a double major, but requires 150 credit hours (instead of 120) and thus is much less common. See the Catalog and the Clarkson Regulations for details.

Minors. In recent years, mathematics students have satisfied the requirements for minors spanning over a dozen different disciplines, from Software Engineering to History to Political Science. See the Catalog for an up-to-date list of available minors. Then see your advisor and the department offering the minor.

Co-ops and Internships. You may spend a summer or semester (or more) working in a professional capacity for a business. Besides providing valuable experience, participating in this program may pave the way to a job after graduation. Usually the junior year is best for a co-op, but you should start planning in the fall of your sophomore year. Contact the Career Center. It's never too early.

Undergraduate Research. Many students participate in research with a faculty member while at Clarkson. For some this gives a change of pace from classroom learning and a taste of what graduate research might be like. For others this becomes a significant part of their education and may culminate in an honors thesis or journal publication. If you're interested, talk early with the mathematics professors to see what they're doing and what your options are. Undergraduate research projects may earn academic credit and may involve work during the semester or the summer.

Off-campus Research. Students with sufficient mathematical preparation may pursue research projects off-campus. The National Science Foundation sponsors many Research Experience for Undergraduates (REU) programs each summer, and many national laboratories have internships or similar opportunities. Such programs are competitive; start your search and apply early.

Study Abroad. Clarkson has agreements with universities in England, Australia, France, and many other countries for transfer of credits taken there. This is usually done in the junior year. Contact the International Center for more information.

Cross-Registration. The Associated Colleges of the St. Lawrence Valley (Clarkson, SUNY Potsdam, St. Lawrence University, and SUNY Canton) have a cross-registration program for transferring credit. You may cross-register for up to two courses per year. Contact your advisor or SAS for details.

Master's Degrees. You can complete an MBA (Master of Business Administration) or MAT (Master of Arts in Teaching) degree at Clarkson in one additional year if you choose appropriate electives as an undergraduate. Contact the Reh School of Business or the Department of Education, respectively, for more information.

Careers. Many careers are open to students with degrees in mathematics—more than you might imagine. For extensive information on careers, visit the websites of the Society for Industrial and Applied Mathematics, the American Mathematical Society, the Mathematical Association of America, and the American Statistical Association. For information about a career as an actuary, visit BeAnActuary.org.

3 Activities

Math Club. This CUSA-sponsored club serves as the focus of extra-curricular student activities in the department. Coordinating events with the AWM, SIAM, and PME chapters, the club organizes math-related informational and social activities for the department, university, and community. Contact Prof. Iyiola for information.

Society for Industrial and Applied Mathematics (SIAM).

SIAM is the leading professional society for mathematicians interested in applied and computational mathematics. All interested students are welcome to join. Contact Prof. Yao for information.

Association for Women in Mathematics (AWM).

Meetings and events are open to all students, regardless of major or gender. These meetings and activities expose students to the world of professional mathematics, to obtain information about career options in mathematics, to network with professional mathematicians, and to develop leadership skills. Contact Prof. Yao for information.

Pi Mu Epsilon (PME). Pi Mu Epsilon is the national mathematics honor society. Membership is honorary and based on scholastic achievement; however, most activities are open to all interested students. Contact Prof. Yao for information.

Mathematical Contest in Modeling (MCM).

Held each spring, the MCM is a contest where teams of undergraduates use mathematical modeling to develop solutions to real-world problems. Contact Prof. Asante-Asamani for information.

William Lowell Putnam Mathematical Competition.

The Putnam Exam is a national competition held each December, testing originality and technical competence. Fame and glory await students who score well. Contact Prof. Greene for information.

4 Graduation Requirements

The following graduation requirements apply to all three majors (MA, AM&S, and DS) in the Mathematics Department.

General requirements for all Clarkson students:

- Complete at least 120 credit hours
- Achieve at least a 2.0 cumulative GPA overall
- Satisfy the Clarkson Common Experience requirements
- Complete the requirements of at least one major
- Achieve at least a 2.0 cumulative GPA in the major

Clarkson Common Experience (CCE) requirements:

Five courses must be taken covering at least four of the six Knowledge Areas (CGI, CSO, EC, IA, IG, and STS); these must include one University Course (which covers two Knowledge Areas). In addition, six communication points must be earned, including at least two points in courses in the major numbered 300 or higher. Most (or all) of these may be earned in these courses:

- Two points: MA211, 363, and 377
- One point: MA311, 313, 314, 321, 322, and STAT488

Details applicable to all majors in the department:

1. The following courses do not count toward graduation: MA030, MA031, MA041, MA042, SC131, and all AS and MS courses at the 100 and 200 levels
2. The following courses are not open to majors in the department (but may count toward graduation as free electives if taken before becoming a major in the department): MA120, MA125, MA180, MA181, MA239, MA277, MA330, STAT282, and STAT318.
3. The GPA in the major is computed based on courses in the *major field of study list*, consisting of all MA courses MA131 or higher except 180, 181, 239, MA277, 300–310, 330, 351, 400–432, 497–499, and all STAT courses except 282, 318, and 488. For the DS major, the GPA computation also includes the courses DS241, DS392, CS141, CS142, CS344, CS449, IS314, IS415, and IS426.

Requirements for the Mathematics (MA) major:

	credit hours
Mathematics (MA) and Statistics (STAT) courses ¹	44
Computer Science (CS141)	4
Physics (PH131 and PH132)	8
Science (PH, CM, or BY course)	3
First-Year Seminar (FY100)	1
The Clarkson Seminar (UNIV190)	3
Knowledge Area Courses	12
University Course	3
Free Electives	42
Total:	120

¹ The MA and STAT courses include the following required courses:

MA131, MA132, MA200, MA211, MA231, MA232, MA321, MA339,
MA499, STAT383, and either MA451 or MA453

plus either of the following options:

Math Option: two of MA311, 312, 313, 314, and 322

Stats Option: all of STAT381, 382, 384, and 488 (1–3 credits)

plus additional MA/STAT courses to total at least 44 credits.

A student may not major in both MA and AM&S.

A worksheet for MA major can be downloaded here for Math Option and Stat Option.

Requirements for the Applied Mathematics and Statistics (AM&S) major:

	credit hours
Mathematics (MA) and Statistics (STAT) courses ¹	44
Computer Science (CS141)	4
Physics (PH131 and PH132)	8
Science (PH, CM, or BY course)	3
First-Year Seminar (FY100)	1
The Clarkson Seminar (UNIV190)	3
Knowledge Area Courses	12
University Course	3
Application Electives ²	15
Free Electives	27
Total:	120

¹The MA and STAT courses include the following required courses:

MA131, MA132, MA200, MA211, MA231, MA232, MA339, MA363, MA377, MA499, STAT383, and either MA451 or MA453

plus three of the following courses:

MA331, MA332, STAT381, STAT382, STAT384

plus additional MA/STAT courses to total at least 44 credits.

²Five Application Electives for the AM&S major must be chosen from the following list:

BY314; CE/SC301, CE420, 438; CH260, 330, 490; CM371, 372
 EC311, EC313, EC350 (or 150 and 200), EC357, EC358, EC384
 EE264, EE321, EE324, EE381; EM333;
 ES220, 222, 223, 250, 260, 330, 340, 400, 405
 AE/ME342, ME442, 443; OM/EM331
 PH221, 231, 323, 325, 331, 380, 381, 432, 451

A student may not major in both AM&S and MA.

A worksheet for AM&S major can be downloaded [here](#).

Requirements for the Data Science (DS) major:

	credit hours
Mathematics (MA) and Statistics (STAT) courses ¹	35
Data Science (DS241, DS392)	6
Computer Science (CS141, CS142, CS344, CS449)	13
Science (BY, CM, or PH courses) ²	8
Information Systems (IS314, IS415, IS426)	9
First-Year Seminar (FY100)	1
The Clarkson Seminar (UNIV190)	3
Knowledge Area and University Courses	15
Application Electives ³	6
Free Electives	24
Total:	120

¹The MA and STAT courses include the following required courses:

MA131, MA132, MA200, MA211, MA231, MA339, MA499,
STAT381, STAT382, STAT383, STAT384, STAT385, and
STAT488 (2 credits)

²The Science courses must include at least two courses with labs.

³Application Electives for the DS major are courses from outside the MA, STAT, CS, and IS course designations that provide depth of knowledge in some domain. Students must take two 3-credit courses at the 200 level or higher, both from the same subject area, with the particular pairing approved by the Mathematics Department.

A worksheet for DS major can be downloaded [here](#).

5 Professional Experience

MA499 Professional Experience. This course records success in completing requirements other than course work for the MA, AM&S, and DS majors, and fulfills the Professional Experience requirement of the Clarkson Common Experience. Given Pass/No credit only. Specific requirements (complete one from each category):

1. Demonstrate skill in computer applications by one of the following:
 - (a) Complete a course from this list: MA377, CS452, EE468, or other courses as may be specified from time to time.
 - (b) Complete a project requiring the effective use of professional level software such as SAS, Matlab, Maple or other software such as that used in the courses mentioned in item (a).
2. Demonstrate skill in communication by at least one of the following:
 - (a) Serve satisfactorily as tutor or undergraduate recitation leader in a mathematics course for at least one semester.
 - (b) Give a presentation at a regional, national or international mathematics meeting.
 - (c) Write a paper on a mathematical subject that is accepted for publication in a national or international mathematics, science or engineering journal.
 - (d) Participate and give a presentation about his or her work in a mathematics seminar at Clarkson.
 - (e) Present for evaluation by the department faculty an acceptable portfolio of writings and/or other communications on mathematical subjects.

3. Demonstrate understanding of the profession by one or more of the following:
 - (a) Serve as an active officer in a student chapter of a professional or honorary society.
 - (b) Complete an internship or a co-op experience in a professional capacity.
 - (c) Participate in an undergraduate research project or a summer research experience for undergraduates.
 - (d) Take part in a mathematics or statistics consulting experience.
 - (e) Attend a meeting of a mathematics or statistics society.
 - (f) Join a professional mathematics or statistics society.

The student must present documentary evidence of satisfying these requirements to the Chair of the Department of Mathematics. Any courses presented to satisfy these requirements may also be counted toward course requirements for graduation.

While students may register for MA499 in either semester of their senior year, planning should start by the junior year at the latest. Satisfaction of the requirements is recorded on a form available from the Mathematics Department office or website and signed by the Department Chair. Individual requirements may be fulfilled and recorded as soon as they are completed.

6 Sample Programs

Sample Program for Mathematics Major (Math Option)

First Year			
MA131 Calculus I	3	MA132 Calculus II	3
PH131 Physics I	4	PH132 Physics II	4
CS141 Computer Science I	4	MA200 Math Modeling & Soft.	3
UNIV190 Clarkson Seminar	3	Knowledge Area Course	3
FY100 First-Year Seminar	1	Free Elective (CS142 rec.)	3
	15		16
Sophomore Year			
MA211 Discrete Math & Proof	3	MA231 Calculus III	3
MA232 Differential Equations	3	MA339 Applied Linear Algebra	3
Science Elective	3	STAT383 Probability & Stats.	3
Knowledge Area Course	3	Knowledge Area Course	3
Free Elective	3	Free Elective	3
	15		15
Junior Year			
MA321 Advanced Calculus I	3	MA312, MA314 or MA322 ¹	3
MA311 or MA313 ¹	3	MA/STAT Elective	3
KA/University Course	3	KA/University Course	3
Free Elective	3	MA451 or MA453	2
Free Elective	3	Free Elective	3
	15		14
Senior Year			
MA/STAT Elective	3	MA/STAT Elective	3
Free Elective	3	Free Elective	3
Free Elective	3	Free Elective	3
Free Elective	3	Free Elective	3
Free Elective	3	Free Elective	3
MA499 Professional Exp.	0		
	15		15

¹These courses are offered in alternate years: take any two of these five (in either your junior or senior year).

Sample Program for Mathematics Major (Statistics Option)

First Year			
MA131 Calculus I	3	MA132 Calculus II	3
PH131 Physics I	4	PH132 Physics II	4
CS141 Computer Science I	4	MA200 Math Model.&Soft.	3
UNIV190 Clarkson Seminar	3	Knowledge Area Course	3
FY100 First-Year Seminar	1	Free Elective (CS142 rec.)	3
	15		16
Sophomore Year			
MA211 Discrete Math&Proof	3	MA231 Calculus III	3
MA232 Differential Eqns.	3	MA339 Applied Linear Alg.	3
Science Elective	3	STAT383 Prob. & Stats.	3
Knowledge Area Course	3	Knowledge Area Course	3
Free Elective	3	Free Elective	3
	15		15
Junior Year			
MA321 Advanced Calculus I	3	STAT382 or STAT384 ¹	3
STAT381 Probability	3	MA/STAT Elective	3
KA/University Course	3	KA/University Course	3
Free Elective	3	MA451 or MA453	2
Free Elective	3	Free Elective	3
	15		14
Senior Year			
STAT488 Statistics Project ²	1–3	STAT382 or STAT384 ¹	3
Free Elective	3	Free Elective	3
Free Elective	3	Free Elective	3
Free Elective	3	Free Elective	3
Free Elective	3	Free Elective	3
MA499 Professional Exp.	0		
	15		15

¹STAT382 and STAT384 are offered in alternate springs. Both are required—each year take the one which is offered.

²If STAT488 is taken for 1 or 2 credits, then another MA/STAT course will be needed to total 44 credits in MA/STAT.

Sample Program for Applied Mathematics and Statistics Major

First Year			
MA131 Calculus I	3	MA132 Calculus II	3
PH131 Physics I	4	PH132 Physics II	4
CS141 Computer Science I	4	MA200 Math Modeling & Soft.	3
UNIV190 Clarkson Seminar	3	Knowledge Area Course	3
FY100 First-Year Seminar	1	Free Elective (CS142 rec.)	3
	15		16
Sophomore Year			
MA211 Discrete Math & Proof	3	MA231 Calculus III	3
MA232 Differential Equations	3	MA339 Applied Linear Algebra	3
Science Elective	3	STAT383 Probability & Stats.	3
Knowledge Area Course	3	Knowledge Area Course	3
Application Elective ¹	3	Application Elective ¹	3
	15		15
Junior Year			
MA377 Numerical Methods	3	MA363 Mathematical Modeling	3
MA/STAT Elective from list ²	3	MA/STAT Elective from list ²	3
KA/University Course	3	KA/University Course	3
Free Elective	3	MA451 or MA453	2
Application Elective ¹	3	Application Elective ¹	3
	15		14
Senior Year			
MA/STAT Elective	3	MA/STAT Elective from list ²	3
Application Elective ¹	3	Free Elective	3
Free Elective	3	Free Elective	3
Free Elective	3	Free Elective	3
Free Elective	3	Free Elective	3
MA499 Professional Exp.	0		
	15		15

¹Five Application Electives from the list on page 8

²Three of: MA331, MA332, STAT381, STAT382, STAT384

Sample Program for Data Science Major

First Year			
MA131 Calculus I	3	MA132 Calculus II	3
CS141 Computer Science I	4	CS142 Computer Science II	3
Science Course (with lab)	4	Science Course (with lab)	4
UNIV190 Clarkson Seminar	3	MA200 Math Model.&Soft.	3
FY100 First-Year Seminar	1	Knowledge Area Course	3
	15		16
Sophomore Year			
MA211 Discrete Math&Proof	3	MA231 Calculus III	3
STAT383 Probability & Stats.	3	MA339 Applied Linear Alg.	3
DS241 Intro to Data Science	3	CS344 Alg. & Data Struct.	3
IS314 Database Design&Mgt.	3	IS415 Data Warehousing	3
Knowledge Area Course	3	Knowledge Area Course	3
	15		15
Junior Year			
CS449 Computational Learning	3	STAT382 or STAT384 ¹	3
STAT381 Probability	3	DS392 Ethics of Data Anal.	3
IS426 Big Data Architecture	3	KA/University Course	3
KA/University Course	3	Free Elective	3
Free Elective	3	Free Elective	3
	15		15
Senior Year			
STAT385 Bayesian Data Anal.	3	STAT 382 or STAT384 ¹	3
Application Elective ²	3	Application Elective ²	3
Free Elective	3	STAT488 Statistics Project	2
Free Elective	3	Free Elective	3
Free Elective	3	Free Elective	3
MA499 Professional Exp.	0		
	15		14

¹STAT382 and STAT384 are offered in alternate springs. Both are required—each year take the one which is offered.

²Two Application Electives as described on page 9

7 Emphasis Areas

Mathematics majors who want to focus their studies in a particular area should consider these groupings of courses. These groupings are simply suggestions from the faculty; they are not requirements.

Actuarial Science: AM&S major or MA major (Statistics Option) together with some of:

- MA300 Seminar in Actuarial Mathematics
- MA377 Numerical Methods
- EC150 Principles of Micro Economics
- EC151 Principles of Macro Economics
- EC311 Introduction to Econometrics
- EC465 Economics and Business Forecasting
- FN361 Corporate Finance
- FN462 Investments

Students interested in pursuing careers as actuaries are encouraged to speak with Professors Mondal and Meysami and to check out the website www.beanactuary.org for information on internships, courses, and the Actuarial Exams.

Applied Mathematics: MA or AM&S major and some of:

- MA315 Introduction to Complex Networks
- MA331 Fourier Series and Boundary Value Problems
- MA332 Intermediate Differential Equations
- MA362 Complex Analysis with Applications
- MA363 Mathematical Modeling
- MA377 Numerical Methods
- STAT381 Probability

You should also consider additional courses in Computer Science (beyond CS142) and in application areas of interest.

Business Applications: AM&S major, MA major (Statistics Option), or DS major, and:

STAT381 Probability
EC150 Principles of Micro Economics
EC151 Principles of Macro Economics
OM331 Operations/Production Management

You should also contact the School of Business to explore other course options and the possibility of completing a minor in a business-related field.

Statistics: MA major (Statistics Option) or AM&S major and:

EC311 Introduction to Econometrics
ES405 Design of Experiments
OM485 Quality Systems Management
PY356 Experimental Psychology

Information on careers in statistics is available from the website of the American Statistical Association.

Pure Mathematics: MA major (Math Option) and many of:

MA311 Abstract Algebra
MA312 Introduction to Differential Geometry
MA313 Abstract Linear Algebra
MA314 Number Theory and its Applications
MA322 Advanced Calculus II
MA332 Intermediate Differential Equations
MA362 Complex Analysis with Applications
STAT381 Probability

If you are planning to apply for graduate school in mathematics, completing an undergraduate research project will be a big plus. Also, remember that graduate courses are open to qualified seniors and juniors; taking one or more core graduate mathematics courses (such as MA511, MA512, MA514, MA521, MA522, MA525, MA531, MA571, MA573, or MA578) while an undergraduate will significantly strengthen your preparation for graduate school.

8 Double Majors

Sample Program for Double Major: Math and Computer Science

First Year			
MA131 Calculus I	3	MA132 Calculus II	3
CS141 Computer Science I	4	CS142 Computer Science II	3
PH131 Physics I	4	PH132 Physics II	4
UNIV190 Clarkson Seminar	3	MA200 Math Modeling & Soft.	3
FY100 First-Year Seminar	1	Knowledge Area Course	3
	15		16
Sophomore Year			
MA211 Discrete Math & Proof	3	MA231 Calculus III	3
MA232 Differential Equations	3	MA339 Applied Linear Algebra	3
CS242 Adv. Prog. Concepts	3	CS241 Computer Organization	3
CS341 Programming Lang.	3	CS344 Data Structures	3
Knowledge Area Course	3	CS350 Software Design/Devel.	3
	15		15
Junior Year			
MA321 Advanced Calculus I	3	STAT383 Probability & Stats.	3
CS345 Automata Theory ¹	3	CS444 Operating Systems	3
Science Elective	4	CS Elective	3
Knowledge Area Course	3	MA451 or MA453	2
KA/University Course	3	KA/University Course	3
	16		14
Senior Year			
MA311 or MA313 ²	3	MA312, MA314 or MA322 ²	3
MA/STAT Elective ¹	3	MA/STAT Elective ¹	3
CS Elective	3	CS Elective	3
CS Elective	3	CS Elective	3
Free Elective	3	Free Elective	3
MA499 Professional Exp.	0	CS499 Professional Exp.	0
	15		15

¹CS courses double-listed as MA courses (e.g., CS/MA345, 442, 447, 449, and 456) count toward the required 44 credits of MA/STAT.

²These courses are offered in alternate years: take any two.

Sample Program for Double Major:
Applied Math & Statistics and Computer Science

First Year			
MA131 Calculus I	3	MA132 Calculus II	3
CS141 Computer Science I	4	CS142 Computer Science II	3
PH131 Physics I	4	PH132 Physics II	4
UNIV190 Clarkson Seminar	3	MA200 Math Model.&Soft.	3
FY100 First-Year Seminar	1	Knowledge Area Course	3
	15		16
Sophomore Year			
MA211 Discrete Math&Proof	3	MA231 Calculus III	3
MA232 Differential Equations	3	MA339 Applied Linear Alg.	3
CS242 Adv. Prog. Concepts	3	CS241 Computer Organiz.	3
CS341 Programming Lang.	3	CS344 Data Structures	3
Science Elective	4	CS350 Software Design/Devel.	3
		Application Elective ¹	3
	16		18
Junior Year			
STAT383 Probability & Stats.	3	MA363 Math Modeling	3
CS345 Automata Theory	3	MA/STAT Elective from list ²	3
Application Elective ¹	3	CS444 Operating Systems	3
Application Elective ¹	3	CS Elective	3
Knowledge Area Course	3	MA451 or MA453	2
KA/University Course	3	KA/University Course	3
	18		17
Senior Year			
MA377 Numerical Methods	3	MA/STAT Elective from list ²	3
MA/STAT Elective from list ²	3	CS Elective	3
CS Elective	3	CS Elective	3
CS Elective	3	Application Elective ¹	3
Application Elective ¹	3	Knowledge Area Course	3
MA499 Professional Exp.	0	CS499 Professional Exp.	0
	15		15

¹Five Application Electives from the list on page 8

²Three of: MA331, MA332, STAT381, STAT382, STAT384

Sample Program for Double Major:
Data Science and Applied Math & Stat

First Year			
MA131 Calculus I	3	MA132 Calculus II	3
CS141 Computer Science I	4	CS142 Computer Science II	3
Science Course (with lab)	4	Science Course (with lab)	4
UNIV190 Clarkson Seminar	3	MA200 Math Model.&Soft.	3
FY100 First-Year Seminar	1	Knowledge Area Course	3
	15		16
Sophomore Year			
MA211 Discrete Math&Proof	3	MA231 Calculus III	3
STAT383 Probability & Stats.	3	MA339 Applied Linear Alg.	3
DS241 Intro to Data Science	3	CS344 Alg. & Data Struct.	3
IS314 Database Design&Mgt.	3	IS415 Data Warehousing	3
Knowledge Area Course	3	Knowledge Area Course	3
	15		15
Junior Year			
CS449 Computational Learning	3	STAT382 or STAT384 ¹	3
STAT381 Probability	3	DS392 Ethics of Data Anal.	3
IS426 Big Data Architecture	3	KA/University Course	3
KA/University Course	3	MA363 Mathematical Modeling	3
MA232 Elementary Diffeq	3	MA451 or MA453	2
		Free Elective	1
	15		15
Senior Year			
STAT385 Bayesian Data Anal.	3	STAT 382 or STAT384 ¹	3
Application Elective ^{2,3}	3	Application Elective ²	3
MA377 Numerical Methods	3	STAT488 Statistics Project	2
Application Elective ³	3	Application Elective ³	3
Application Elective ³	3	Application Elective ³	3
MA499 Professional Exp.	0		
	15		14

¹STAT382 and STAT384 are offered in alternate springs. Both are required – each year take the one which is offered.

²Two Application Electives as described on page 9.

³Five Application Electives as described on page 8.

Sample Program for Double Major:
Data Science and Math (Stat Option)

First Year			
MA131 Calculus I	3	MA132 Calculus II	3
CS141 Computer Science I	4	CS142 Computer Science II	3
PH131 Physics I	4	PH132 Physics II	4
UNIV190 Clarkson Seminar	3	MA200 Math Model.&Soft.	3
FY100 First-Year Seminar	1	Knowledge Area Course	3
	15		16
Sophomore Year			
MA211 Discrete Math&Proof	3	MA231 Calculus III	3
STAT383 Probability & Stats.	3	MA339 Applied Linear Alg.	3
DS241 Intro to Data Science	3	CS344 Alg. & Data Struct.	3
IS314 Database Design&Mgt.	3	IS415 Data Warehousing	3
Knowledge Area Course	3	Knowledge Area Course	3
	15		15
Junior Year			
CS449 Computational Learning	3	STAT382 or STAT384 ¹	3
STAT381 Probability	3	DS392 Ethics of Data Anal.	3
IS426 Big Data Architecture	3	KA/University Course	3
KA/University Course	3	MA232 Elementary Diffeq	3
Free Elective	3	Free Elective	3
	15		15
Senior Year			
STAT385 Bayesian Data Anal.	3	STAT 382 or STAT384 ¹	3
Application Elective ²	3	Application Elective ²	3
MA321 Advanced Calculus	3	STAT488 Statistics Project	2
Free Elective	3	MA451 or MA453	2
Free Elective	3	Free Elective	4
MA499 Professional Exp.	0		
	15		14

¹STAT382 and STAT384 are offered in alternate springs. Both are required—each year take the one which is offered.

²Two Application Electives as described on page 9

Sample Program for Double Major: Mathematics and Physics

First Year			
MA131 Calculus I	3	MA132 Calculus II	3
PH131 Physics I	4	PH132 Physics II	4
PH121 Physics FR Seminar ¹	1	MA200 Math Model.&Soft.	3
CS141 Computer Science I	4	Free Elective (CS142 rec.)	3
UNIV190 Clarkson Seminar	3	Knowledge Area Course	3
FY100 First-Year Seminar	1		
	16		16
Sophomore Year			
MA211 Discrete Math&Proof	3	MA231 Calculus III	3
MA232 Differential Equations	3	MA339 Applied Linear Alg.	3
PH231 Modern Phy. w. Lab	4	PH221 Theoretical Mechanics	3
CM131 Chemistry I	4	PH327 Experimental Phy. I	3
Knowledge Area Course	3	CM132 Chemistry II	4
	17		16
Junior Year			
MA321 Advanced Calculus I	3	MA312, MA314 or MA322 ²	3
STAT383 Probability&Stats.	3	MA331 Fourier Series&BVPs	3
PH325 Thermal Physics	3	PH331 Quantum Physics I	3
PH380 Electromag Theory I	3	Knowledge Area Course	3
Biology Elective	3	MA451 or MA453	2
	15		14
Senior Year			
MA311 or MA313 ²	3	MA/STAT Elective	3
MA/STAT Elective	3	Free Elective	3
PH Elective (PH432 rec.)	3	Free Elective	3
PH Professional Elective	3	Free Elective	3
KA/University Course	3	KA/University Course	3
PH435 Senior Seminar	1	MA499 Professional Exp.	0
	16		15

¹If the Physics major is declared after the first year, PH121 may be replaced by a PH elective in the Junior or Senior year.

²These courses are offered in alternate years: take any two of these four (in either your junior or senior year).

Sample Program for Double Major:
Applied Mathematics & Statistics and Physics

First Year			
MA131 Calculus I	3	MA132 Calculus II	3
PH131 Physics I	4	PH132 Physics II	4
PH121 Physics FR Seminar ¹	1	MA200 Math Modeling & Soft.	3
CS141 Computer Science I	4	Free Elective (CS142 rec.)	3
UNIV190 Clarkson Seminar	3	Knowledge Area Course	3
FY100 First-Year Seminar	1		
	16		16
Sophomore Year			
MA211 Discrete Math & Proof	3	MA231 Calculus III	3
MA232 Differential Equations	3	MA339 Applied Linear Algebra	3
PH231/2 Modern Physics/Lab	4	PH221 Theoretical Mechanics	3
CM131 Chemistry I	4	PH327 Experimental Physics I	3
Knowledge Area Course	3	CM132 Chemistry II	4
	17		16
Junior Year			
MA377 Numerical Methods	3	MA363 Math Modeling	3
STAT383 Probability & Stats.	3	MA331 Fourier Series & BVPs	3
PH325 Thermal Physics	3	PH331 Quantum Physics I	3
PH380 Electromag Theory I	3	Knowledge Area Course	3
Biology Elective	3	MA451 or MA453	2
	15		14
Senior Year			
MA/STAT Elective from list ²	3	MA/STAT Elective from list ²	3
MA/STAT Elective	3	Free Elective	3
PH Elective (PH432 rec.)	3	Free Elective	3
PH Professional Elective	3	Free Elective	3
KA/University Course	3	KA/University Course	3
PH435 Senior Seminar	1	MA499 Professional Exp.	0
	16		15

¹If the Physics major is declared after the first year, PH121 may be replaced by a PH elective in the Junior or Senior year.

²Two of: MA332, STAT381, STAT382, STAT384

9 Minors

Minors in the Department of Mathematics:

- Minor in Mathematics
- Minor in Data Science
- Minor in Statistics
- Minor in Computational Science

In addition to the requirements stated on the following pages, you must satisfy University requirements regarding Minors:

- A minimum 2.0 grade point average is required in the minor;
- Only zero credit hour courses can be designated as pass/no entry;
- At least one-fourth of the credit hours required must be completed at Clarkson, unless an exception is approved by the Dean of the minor program.

9.1 Mathematics Minor

The Minor in Mathematics is open to all students except those majoring in Mathematics, Applied Mathematics and Statistics, Data Science, or Mathematical Economics. To complete the minor the student must achieve at least a 2.0 grade-point average in seven three-credit courses from the following list:

- MA131 Calculus I
- MA132 Calculus II
- MA200 Introduction to Mathematical Modeling and Software
- MA211 Discrete Mathematics and Proof
- MA230 3-D Space and Projective Geometry or MA231 Calculus III
- MA232 Elementary Differential Equations
- MA239 Elementary Linear Algebra
- MA277/MA377 Elementary Numerical Methods/Numerical Methods
- DS241/MA241 Intro to Data Science

- Any 3-credit MA or STAT course at the 300-level or above, except STAT318 Biostatistics, MA451 Introduction to Mathematical Research and MA453 Introduction to Instruction.
- Any CS course which is double-listed as an MA course at the 300-level or above also counts toward the minor; check with the Mathematics Department for details.

At least one-fourth of the credit hours required must be completed at Clarkson, unless an exception is approved by the Dean of the School of Arts and Sciences.

9.2 Data Science Minor

The Minor in Data Science is open to all students except those majoring in Data Science or Business Intelligence and Data Analytics program. To complete the minor the student must achieve at least a 2.0 grade-point average in 7 three-credit courses from the following list, one three-credit course from each category. The lists will be updated by the minor advisory committee as needed.

- Choose one of the following courses
 - MA 131 Calculus I
 - MA181 Basic Calculus
- Choose one of the following courses
 - MA239 Linear Algebra for Data Science
 - MA339 Applied Linear Algebra
 - MA232 Elementary Differential Equations
- Choose one of the following courses
 - STAT282 General Statistics
 - STAT318 Biostatistics
 - STAT383/389 Probability and Statistics/Probability and Statistics with Multivariate Analysis
 - BY314/514 Bioinformatics
 - IA530 Probability & Statistics for Analytics
- Choose one of the following courses
 - CS141 Introduction to Computer Science I
 - ES100 Introduction to Engineering Use of the Computer

- IS110 Intro to Business Intelligence and Data Analytics
 - IS237 Intro to Application Development
- Choose one of the following courses
 - MA/DS241 Introduction to Data Science
 - IS301 Applied Data Analytics
 - IA640 Information Visualization
- Choose one of the following courses
 - IS314 Database Design Management CS460/EE468 Database Systems IA510 Database Modeling, Design Implementation
- Choose one of the following courses*
 - CS344 Algorithms and Data Structures
 - CS/MA449 Computational Learning
 - CS451 Artificial Intelligence
 - CS470 Deep Learning
 - CS473 Computer Vision
 - EE402 Machine Learning on Biomedical Signals
 - IS400 Applied Machine Learning
 - IS415 Data Warehousing
 - ME419 Data Science Tools
 - STAT385 Bayesian Data Analysis
 - STAT386 Time Series

Note:

- A capstone/project-based course or application elective that the Minor Advisory Committee approves is also acceptable.
- Any of the following grad-level courses is also acceptable:
 - CE/SC/EV502 Applications in Geospatial Analytics, Science, and Engineering
 - IA605 Data Warehousing
 - IA628 Introduction to Big Data Architecture and Applications
 - IA650 Data Mining
 - IA651 Applied Machine Learning

9.3 Statistics Minor

The minor in Statistics is open to all students except those majoring in Mathematics, Applied Mathematics and Statistics, or Data Science. To complete the minor the student must achieve at least a 2.0 grade-point average in courses totaling at least 21 credits. The courses required are listed below.

- **Calculus:** MA181 Basic Calculus, or MA131 Calculus I, or Equivalent
- **Linear Algebra:** MA239 Elementary Linear Algebra, or MA339 Applied Linear Algebra, or Equivalent
- **Introductory Statistics:**
 - STAT282 Probability and Statistics, or
 - STAT 318 Biostatistics, or
 - STAT383 Probability and Statistics or Equivalent
- **Statistics or Projects:**

At least 12 additional credits from statistics courses or projects including at least two statistics courses or projects from departments other than Mathematics.

At least one-fourth of the credit hours required must be completed at Clarkson, unless an exception is approved by the Dean of the School of Arts and Sciences. All courses are 3 credits unless noted.

9.4 Computational Science Minor

The minor in Computational Science is available to students in any major. The minor allows students to develop an expertise in Computational Science while pursuing a conventional major, which provides the context wherein they apply their computational skills. To complete the minor the student must achieve a grade-point average of at least 2.00 in courses totaling at least 21 credits. The courses required are listed below.

- Required course: MA377 Numerical Methods

- Choose two of the following courses:
 - MA232 Elementary Differential Equations
 - MA239 Elementary Linear Algebra or MA339 Applied Linear Algebra, or
 - STAT282 General Statistics or STAT383 Probability and Statistics
- Application area electives:

Students must take at least 12 additional credits from application area electives. Application area electives are computational courses in departments other than Mathematics, typically drawn from the student's major. The current list of approved courses is maintained by the Mathematics Department.

10 Faculty

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Courtesy Appointments:

Brian Helenbrook (Engineering)
Christopher Lynch (Comp. Sci.)
Christino Tamon (Comp. Sci.)
Katie Kavanagh (STEM Edu.)

Emeritus Faculty:

Abdul Jerri, Professor
David Powers, Professor
Michael Felland, Instructor
Scott Fulton, Professor

MA499: Professional Experience

This course documents the successful completion of a professional development experience required for the major. Through this experience, students will apply mathematical knowledge in real-world or academic settings while developing skills in communication, collaboration, and problem-solving. The course is graded on a Pass/No Credit basis.

To satisfy this requirement, students must complete one of the following activities:

1. An undergraduate research project supervised by a faculty member in the department (with optional co-advising from other departments),
2. An internship (paid or unpaid) or a cooperative education experience in a professional capacity, or
3. Satisfactory teaching service, such as tutoring, serving as an undergraduate teaching assistant in a mathematics course for at least one semester, or other department-approved teaching-related duties.

Students fulfilling the requirement through a research project or internship must submit a report endorsed by their supervisor(s) to the Chair of the Department of Mathematics. This submission must include:

- A formal letter from the supervisor confirming successful completion of the experience,
- A brief summary of the activities undertaken, and
- The duration of the experience.

Although students may enroll in MA499 during any semester of their senior year, planning should begin no later than the junior year. Completion is documented using a form available from the Department of Mathematics office or website, which must be signed by the Department Chair. Students are encouraged to submit documentation as soon as the experience is completed.

The student must provide documentary evidence of meeting these requirements to the Chair of the Department of Mathematics. Any courses approved to satisfy this requirement may also count toward graduation requirements.

Requirement satisfied by:

Date: _____

Signature (Print and Sign): _____

Attach additional documentation if required.

Student Advising Worksheet – Clarkson University

STUDENT:

GRAD DATE:

STUDENT ID #:

PHONE #:

MAJOR: **Mathematics (Math Option)**

OTHER INFO:

GPA:

MINOR(S):

COMMON EXPERIENCE COURSES					
Title	Course	CR	Term	GR	Notes
The Clarkson Seminar	UNIV190	3			
Computer Science	CS141	4			
Physics	PH131	4			
Physics	PH132	4			
Science (PH, CM or BY)		3			
First Year Seminar**	FY100				1 credit

Free Electives					
Title	Course	CR	Term	Grade	Notes
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					

EXTRA COURSEWORK (IF ANY)									
Course	CR	Term	GR	Notes	Course	CR	Term	GR	Notes

KNOWLEDGE AREAS & COMMUNICATION POINTS			
KNOWLEDGE AREA	KA Course	COMM Course	Points (6)
1		MA211	C2
2		MA321	C1
3			C1
4			C1
5 UNIVERSITY Course (/)			

Students must complete at least 5 knowledge area courses that cover 4 of the following 6 knowledge areas:

- Contemporary & Global Issues (CGI)
- Cultures & Society (CSO)
- Imaginative Arts (IA)
- Science, Technology & Society (STS)
- Economics & Organizations (EC)
- Individual & Group Behavior (IG)

One of these five courses must be University Course that has two knowledge area designators (UNIV)

Students must complete a total of at least 6 communication points.

Mathematics					
Title	Course	CR	Term	GR	Notes
Calculus I	MA 131	3			
Calculus II	MA 132	3			
Intro to Mathematical Modeling	MA 200	3			
Discrete Mathematics and Proof	MA 211	3			C2
Calculus III	MA 231	3			
Elementary Differential Equations	MA 232	3			
Advanced Calculus I	MA 321	3			C1
Applied Linear Algebra	MA 339	3			
Professional Experience	MA 499	0			
Intro to math research or instruction*	MA 451/MA453	1-3			
Probability and Statistics	STAT 383	3			
Math Option Elective 1		3			
Math Option Elective 2		3			
MA/STAT Elect – see list below		3			
MA/STAT Elect – see list below					
MA/STAT Elect – see list below		3			
Knowledge Area		3			
Knowledge Area		3			
Knowledge Area		3			
Knowledge Area		3			
Knowledge /UNIV Course		3			

Math Option Elective Courses : (choose 2)

MA311 - Abstract algebra (pre-req: MA211, C1, Odd Fall)
 MA312 - Intro to different. Geometry (pre-req: MA231&MA339, C1)
 MA313 - Abstract linear algebra (pre-req: MA211 & MA339, C1, Even Fall)
 MA314 - Number theory and its applications (pre-req: MA211, C1, Odd Spr)
 MA322 - Advanced calculus 2 (pre-req: MA321, C1, Even Spr)

RECOMMENDED MA/STAT ELECTIVE COURSES:

MA315 Intro to complex networks (pre-req: MA132, Fall)
 MA331 - Fourier Series&Bound. Value (pre-req: MA231&MA232, Spr)
 MA332 - Intermediate Differ. Eqns (pre-req: MA231&MA232, Odd Spr)
 MA363 - Mathematical Modeling (pre-req:MA231,MA232&PH132, Spr, C2)
 MA377 - Numerical methods (MA230 or MA231, Fall, C2)
 STAT381 - Probability (pre-req: MA231 or MA230 (MA211 recommended)
 STAT382 - Mathematical Statistics (pre-req: MA/STAT381)
 STAT383 - Probability and Statistics (pre-req: MA132)
 STAT384 - Advanced Applied Statistics (MA231 & Stat 383)

*Students can take both MA451 and MA453 (2 credit each for MA major), but only one is required. Students with a Pre-teaching minor can take up to 3 credits each.

Notes:

Student Advising Worksheet – Clarkson University

STUDENT:

GRAD DATE:

STUDENT ID #:

PHONE #:

MAJOR: **Mathematics (STAT Option)**

OTHER INFO:

GPA:

MINOR(S):

COMMON EXPERIENCE COURSES					
Title	Course	CR	Term	GR	Notes
The Clarkson Seminar	UNIV190	3			
Computer Science	CS141	4			
Physics	PH131	4			
Physics	PH132	4			
Science (PH, CM or BY)		3			
First Year Seminar**	FY100				1 credit
Free Electives					
Title	Course	CR	Term	Grade	Notes
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					

Mathematics					
Title	Course	CR	Term	GR	Notes
Calculus I	MA 131	3			
Calculus II	MA 132	3			
Intro to Mathematical Modeling	MA 200	3			
Discrete Mathematics and Proof	MA 211	3			C2
Calculus III	MA 231	3			
Elementary Differential Equations	MA 232	3			
Advanced Calculus I	MA 321	3			C1
Applied Linear Algebra	MA 339	3			
Professional Experience	MA 499	0			
Intro to math research or instruction*	MA 451/MA453	1-3			
Probability and Statistics	STAT 383	3			
STAT Option Course 1		3			
STAT Option Course 2		3			
STAT Option Course 3		3			
STAT Option Course 4		3			
Math Elective – see list below					
Knowledge Area		3			
Knowledge Area		3			
Knowledge Area		3			
Knowledge Area		3			
Knowledge /UNIV Course		3			

EXTRA COURSEWORK (IF ANY)									
Course	CR	Term	GR	Notes	Course	CR	Term	GR	Notes

KNOWLEDGE AREAS & COMMUNICATION POINTS			
KNOWLEDGE AREA	KA Course	COMM Course	Points (6)
1		MA211	C2
2		MA 321	C1
3			
4			
5 UNIVERSITY Course (/)			
Students must complete at least 5 knowledge area courses that cover 4 of the following 6 knowledge areas: ➤ Contemporary & Global Issues (CGI) ➤ Cultures & Society (CSO) ➤ Imaginative Arts (IA) ➤ Science, Technology & Society (STS) ➤ Economics & Organizations (EC) ➤ Individual & Group Behavior (IG) One of these five courses must be University Course that has two knowledge area designators (UNIV) Students must complete a total of at least 6 communication points.			

STAT Option Courses:	
STAT381 - Probability (pre-req: MA231 or MA230 (MA211 recommended))	
STAT382 - Mathematical Statistics (pre-req: MA/STAT381)	
STAT384 - Advanced Applied Statistics (MA231 & Stat 383)	
STAT488 - Statistics projects (1-3 credits, consent of the instructor, C2)	
RECOMMENDED MATH ELECTIVE COURSES:	
STAT383** – Probability and Statistics (pre-req: MA132)	
STAT385 - Probability and Statistics (1-3 credits, pre-req: STAT383 or 381)	
STAT389** – Probability and Statistics with multivar. anal(pre-req: MA231)	
MA315 Intro to complex networks (pre-req: MA132, Fall)	
MA331 - Fourier Series&Bound. Value (pre-req: MA231&MA232, Spr)	
MA332 - Intermediate Differ. Eqns (pre-req: MA231&MA232, Odd Spr)	
MA363 - Mathematical Modeling (pre-req:MA231,MA232&PH132, Spr, C2)	
MA377 - Numerical methods (MA230 or MA231, Fall, C2)	
*Students can take both MA451 and MA453 (2 credit each for MA major), but only one is required. Students with a Pre-teaching minor can take up to 3 credits each.	
** Cannot receive credits for both STAT383 and STAT389.	
Notes:	

Student Advising Worksheet – Clarkson University

STUDENT:

GRAD DATE:

STUDENT ID #:

PHONE #:

MAJOR: Applied Mathematics and Statistics

OTHER INFO:

GA:

MINOR(S):

COMMON EXPERIENCE COURSES					
Title	Course	CR	Term	GR	Notes
The Clarkson Seminar	UNIV190	3			
Computer Science	CS141	4			
Physics	PH131	4			
Physics	PH132	4			
Science (PH, CM or BY)		3			
First Year Seminar**	FY100				1 credit

Free Electives					
Title	Course	CR	Term	Grade	Notes
Application Electives 1*					
Application Electives 2*					
Application Electives 3*					
Application Electives 4*					
Application Electives 5*					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					

EXTRA COURSEWORK (IF ANY)									
Course	CR	Term	GR	Notes	Course	CR	Term	GR	Notes

KNOWLEDGE AREAS & COMMUNICATION POINTS			
KNOWLEDGE AREA	KA Course	COMM Course	Points (6)
1		MA211	C2
2		MA363	C2
3		MA377	C2
4			
5 UNIVERSITY Course (/)			
Students must complete at least 5 knowledge area courses that cover 4 of the following 6 knowledge areas:			
➢ Contemporary & Global Issues (CGI) ➢ Cultures & Society (CSO) ➢ Imaginative Arts (IA) ➢ Science, Technology & Society (STS) ➢ Economics & Organizations (EC) ➢ Individual & Group Behavior (IG)			
One of these five courses must be University Course that has two knowledge area designators (UNIV)			
Students must complete a total of at least 6 communication points.			

Applied Mathematics and Statistics					
Title	Course	CR	Term	GR	Notes
Calculus I	MA 131	3			
Calculus II	MA 132	3			
Intro to Mathematical Modeling	MA 200	3			
Discrete Mathematics and Proof	MA 211	3			C2
Calculus III	MA 231	3			
Elementary Differential Equations	MA 232	3			
Applied Linear Algebra	MA 339	3			
Mathematical Modeling	MA 363	3			C2
Numerical Methods	MA 377	3			C2
Professional Experience	MA 499	0			
Intro to math research or instruction**	MA 451/MA453	1-3			
Probability and Statistics	STAT 383	3			
MA/STAT Electives***		3			
MA/STAT Electives***		3			
MA/STAT Electives***		3			
MA/STAT Electives***		3			

Knowledge Area		3			
Knowledge Area		3			
Knowledge Area		3			
Knowledge Area		3			
Knowledge /UNIV Course		3			

***Application ELECTIVE COURSES: (Choose 5)**
 BY314; CE301, 420, 438; CH260, 330, 490; CM371, 372
 EC311, 313, 350 (or 150 and 200), 357, 358, 384
 EE/ME 324
 EE264; EM333
 ES220, 222, 223, 250, 260, 330, 340, 400, 405
 ME342, 442, 443; OM331
 PH221, 231, 323, 325, 331, 380, 381, 432, 451

**Students can take both MA451 and MA453 (2 credit each for MA major), but only one is required. Students with a Pre-teaching minor can take up to 3 credits each.

*****MA/STAT Electives Courses: (Choose 3)**
 MA331 - Fourier Series & Bound. Value (pre-req: MA231&MA232, Spr)
 MA332 - Intermediate Differ. Eqns (pre-req: MA231&MA232, Odd Spr)
 STAT381 - Probability (pre-req: MA231 or MA230 (MA211 recommended))
 STAT382 - Mathematical Statistics (pre-req: MA/STAT381)
 STAT384 - Advanced Applied Statistics (MA231 & Stat 383)

Notes:

Student Advising Worksheet – Clarkson University

STUDENT:

GRAD DATE:

STUDENT ID #:

PHONE #:

MAJOR: Data Science

OTHER INFO:

GPA:

MINOR(S):

COMMON EXPERIENCE COURSES					
Title	Course	CR	Term	GR	Notes
The Clarkson Seminar	UNIV190	3			
Science with Lab (PH, CM or BY)		4			
Science with Lab (PH, CM or BY)		4			
First Year Seminar**	FY100	1			1 credit

Free Electives					
Title	Course	CR	Term	Grade	Notes
Application Elective 1					
Application Elective 2					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					
Free Elective					

EXTRA COURSEWORK (IF ANY)									
Course	CR	Term	GR	Notes	Course	CR	Term	GR	Notes

Title	Course	CR	Term	GR	Notes
Knowledge Area		3			
Knowledge Area		3			
Knowledge Area		3			
Knowledge Area		3			
Knowledge /UNIV Course		3			

KNOWLEDGE AREAS & COMMUNICATION POINTS			
KNOWLEDGE AREA	KA Course	COMM Course	Points (6)
1		MA211	C2
2			
3			
4			
5 UNIVERSITY Course (/)			

Students must complete at least 5 knowledge area courses that cover 4 of the following 6 knowledge areas:

- Contemporary & Global Issues (CGI)
- Cultures & Society (CSO)
- Imaginative Arts (IA)
- Science, Technology & Society (STS)
- Economics & Organizations (EC)
- Individual & Group Behavior (IG)

One of these five courses must be University Course that has two knowledge area designators (UNIV)

Students must complete a total of at least 6 communication points.

Data Science					
Title	Course	CR	Term	GR	Notes
Calculus I	MA 131	3			
Calculus II	MA 132	3			
Intro to Mathematical Modeling	MA 200	3			
Discrete Mathematics and Proof	MA 211	3			C2
Calculus III	MA 231	3			
Applied Linear Algebra	MA 339	3			
Professional Experience	MA 499	0			
Probability	STAT 381	3			
Mathematical Statistics	STAT 382	3			
Probability and Statistics	STAT 383	3			
Advanced Applied Statistics	STAT 384	3			
Bayesian Data Analysis	STAT 385	3			
Statistics Projects	STAT 488	2			
Introduction to Data Science	DS 241	3			
Ethics in Data Science and Applied Mathematics	DS 392	3			
Intro to Computer Science 1	CS 141	4			
Intro to Computer Science 2	CS 142	3			
Algorithms and Data Structures	CS 344	3			
Computational Learning	CS 449	3			
Database Design & Management	IS 314	3			
Data Warehousing for Analytics	IS 415	3			
Big Data Architecture	IS 426	3			

Application ELECTIVE COURSES: (Choose 2)

Application electives for the DS major are courses from outside the MA, STAT, CS, and IS course designations that provide depth of knowledge in some domain. Students must take two 3-credit courses at the 200 level or higher, both from the same subject area, with the particular pairing approved by the math department.

A few sample pairs approved in the past include:

- COMM 329 Front End Development for Web
- COMM 310 Mass Media and Society
- PHIL 330 Logic for Critical Thinking
- PHIL 350 Philosophy of Artificial Intel
- POL230 Intro to Global Politics
- POL 353 Politics of Protest

* A student may not major in both AM&S and either MA or DS.

Notes:

