

Data Science (Collaborative Specialization)

Program Requirements

Students enrolled in the Collaborative Specialization in Data Science must meet the requirements of their respective home units as well as those of the Collaborative Specialization. The requirements of the Collaborative Specialization do not, however, add to the number of credits students are required to accumulate by their home unit and the credit value of the degree remains the same. Consult the individual programs for detailed program requirements.

M.Sc. Biology with Specialization in Data Science (5.0 credits)

Requirements:

1. 0.5 credit in approved coursework	0.5
2. 0.5 credit in:	0.5
DATA 5000 [0.5] Data Science Seminar	
3. 4.0 credits in:	4.0
BIOL 5909 [4.0] M.Sc. Thesis	
Total Credits	5.0

M.A.Sc. Biomedical Engineering with Specialization in Data Science (5.0 credits)

Requirements:

1. 0.5 credit in:	0.5
BIOM 5010 [0.5] Introduction to Biomedical Engineering	
2. 0.5 credit in:	0.5
DATA 5000 [0.5] Data Science Seminar	
3. 1.0 credit in BIOM (BMG) courses	1.0
4. 0.5 credit in elective courses taken either at Carleton University or University of Ottawa with the approval of the OCIBME Director or Associate Director	0.5
5. 2.5 credits in:	2.5
BIOM 5909 [2.5] M.A.Sc. Thesis	
6. 0.0 credit in:	0.0
BIOM 5800 [0.0] Biomedical Engineering Seminar	
Total Credits	5.0

M.B.A. with Concentration in Business Analytics (2.25 credits)

Listed below are the requirements for the Concentration in Business Analytics. For a full description of M.B.A. requirements, visit the Business page.

Concentration requirements (2.25 credits):

1. 1.75 credits in:	1.75
ACCT 5012 [0.25] Performance Measurement and Control	
DATA 5000 [0.5] Data Science Seminar	
FINA 5511 [0.25] Investments	
ITIS 5431 [0.25] Business Analytics for Managers	

ITIS 5432 [0.25] Business Analytics Methods	
TOMS 5303 [0.25] Managing Projects	
2. 0.5 credit in elective concentration course from:	0.5
BUSI 6905 [0.5] Advanced Statistical Methods for Business Research	
ECON 5027 [0.5] Econometrics I	
ECON 5055 [0.5] Financial Econometrics	
STAT 5602 [0.5] Analysis of Categorical Data	
STAT 5702 [0.5] Modern Applied and Computational Statistics	
STAT 5703 [0.5] Data Mining	
Total Credits	2.25

Master of Cognitive Science with Specialization in Data Science (5.0 credits)

Requirements - Thesis Option (5.0 credits)

1. 0.5 credit in:	0.5
DATA 5000 [0.5] Data Science Seminar	
2. 0.5 credit in:	0.5
CGSC 5100 [0.5] Issues in Cognitive Science	
3. 0.5 credit in:	0.5
CGSC 5101 [0.5] Experimental Methods and Statistics	
4. 1.0 credit in CGSC or other approved courses, from two different cognitive disciplines, selected in consultation with the graduate supervisor.	1.0
5. 2.5 credits in:	2.5
CGSC 5909 [2.5] M. Cog. Thesis (The thesis must be approved as fulfilling the data science requirement and be supervised by a faculty member working in a data science related field.)	
6. Preparation of research for presentation at the Carleton Cognitive Science Spring Conference.	

Total Credits 5.0

Requirements - Research Project Option (5.0 credits)

1. 0.5 credit in:	0.5
DATA 5000 [0.5] Data Science Seminar	
2. 0.5 credit in:	0.5
CGSC 5100 [0.5] Issues in Cognitive Science	
3. 0.5 credit in:	0.5
CGSC 5101 [0.5] Experimental Methods and Statistics	
4. 1.5 credits from:	1.5
CGSC 5001 [0.5] Cognition and Artificial Cognitive Systems	
CGSC 5002 [0.5] Experimental Research in Cognition	
CGSC 5003 [0.5] Cognition and Language	
CGSC 5004 [0.5] Cognition and Conceptual Issues	
CGSC 5005 [0.5] Cognition and Neuroscience	
5. 1.0 credit in CGSC or other approved courses selected in consultation with the graduate supervisor.	1.0
6. 1.0 credit in:	1.0

CGSC 5908 [1.0]	Research Project (Project must be approved as fulfilling the data science requirement and be supervised by a faculty member working in a data science related field.)
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7. Preparation of research for presentation at the Cognitive Science Spring Conference.

Total Credits 5.0

M.A. Communication with Specialization in Data Science (5.0 credits)

Requirements - Coursework Option (5.0 credits)

1. 0.5 credit in: 0.5

DATA 5000 [0.5]	Data Science Seminar
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2. 1.0 credit in: 1.0

COMS 5101 [1.0]	Foundations of Communication Studies
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3. 0.5 credit in: 0.5

COMS 5605 [0.5]	Approaches to Communication Research
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4. 0.5 credit in: 0.5

COMS 5225 [0.5]	Critical Data Studies
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5. 0.5 credit from: 0.5

COMS 5203 [0.5]	Communication, Technology, Society
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COMS 5221 [0.5]	Science and the Making of Knowledge
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COMS 5224 [0.5]	Internet, Infrastructure, Materialities
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6. 2.0 credits in electives 2.0

Total Credits 5.0

Requirements - Research Essay Option (5.0 credits)

1. 0.5 credit in: 0.5

DATA 5000 [0.5]	Data Science Seminar
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2. 1.0 credit in: 1.0

COMS 5101 [1.0]	Foundations of Communication Studies
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3. 0.5 credit in: 0.5

COMS 5605 [0.5]	Approaches to Communication Research
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4. 0.5 credit in: 0.5

COMS 5225 [0.5]	Critical Data Studies
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5. 1.0 credit in: 1.0

COMS 5908 [1.0]	Research Essay
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Research Essay on a Data Science topic approved by the Advisory Board representative from Communication in consultation with the graduate Committee of the Institute of Data Science.

6. 1.5 credits in electives. 1.5

Total Credits 5.0

Requirements - Thesis Option (5.0 credits)

1. 0.5 credit in: 0.5

DATA 5000 [0.5]	Data Science Seminar
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2. 1.0 credit in: 1.0

COMS 5101 [1.0]	Foundations of Communication Studies
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3. 0.5 credit in: 0.5

COMS 5605 [0.5]	Approaches to Communication Research
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4. 0.5 credit in: 0.5

COMS 5225 [0.5]	Critical Data Studies
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5. 2.0 credits in: 2.0

COMS 5909 [2.0]	M.A. Thesis
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M.A. Thesis on a Data Science topic approved by the Advisory Board representative from Communication in consultation with the Graduate Committee of the Institute of Data Science.

6. 0.5 credit in electives 0.5

Total Credits 5.0

M.C.S. Computer Science with Specialization in Data Science (5.0 credits)

Requirements - Thesis Option (5.0 credits)

1. 0.5 credit in: 0.5

DATA 5000 [0.5]	Data Science Seminar
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2. 1.0 credit from: 1.0

COMP 5100 [0.5]	Topics in Artificial Intelligence
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COMP 5101 [0.5]	Distributed Databases and Transaction Processing Systems
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COMP 5107 [0.5]	Statistical and Syntactic Pattern Recognition
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COMP 5108 [0.5]	Algorithms in Bioinformatics
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COMP 5111 [0.5]	Data Management for Business Intelligence
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COMP 5112 [0.5]	Algorithms for Data Science
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COMP 5204 [0.5]	Computational Aspects of Geographic Information Systems
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COMP 5209 [0.5]	Visual Analytics
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COMP 5305 [0.5]	Advanced Database Systems
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COMP 5306 [0.5]	Data Integration
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COMP 5307 [0.5]	Knowledge Representation
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COMP 5308 [0.5]	Topics in Medical Computing
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COMP 5401 [0.5]	Electronic Commerce Technologies
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COMP 5703 [0.5]	Algorithm Analysis and Design
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COMP 5704 [0.5]	Parallel Algorithms and Applications in Data Science
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3. 1.0 credit in course work 1.0

4. 2.5 credits in: 2.5

COMP 5905 [2.5]	M.C.S. Thesis
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Total Credits 5.0

Notes:

1. Course selections must include a minimum of 1.5 credits of OCICS courses in three different research areas, and must include at least (see OCICS course listing): 0.5 credit in software engineering, 0.5 credit in the theory of computing, and 0.5 credit in either computer applications or computer systems.
2. M.C.S. Thesis must be in an area of Data Science and requires approval from the Department. Each candidate submitting a thesis will be required to undertake an oral defence of the thesis.

M.A. Economics with Specialization in Data Science (4.0 credits)

Requirements - Coursework option (4.0 credits)

1. 1.5 credits in:	1.5
ECON 5020 [0.5] Microeconomic Theory	
ECON 5021 [0.5] Macroeconomic Theory	
ECON 5027 [0.5] Econometrics I	
2. 0.5 credit in:	0.5
DATA 5000 [0.5] Data Science Seminar	
3. 0.5 credit in:	0.5
ECON 5029 [0.5] Methods of Economic Research	
including a research paper on a data science related topic	
4. 1.0 credit in ECON approved by the M.A. Supervisor of the Department of Economics, including at least 0.5 credit from ECON 5055, ECON 5361, ECON 5362, ECON 5700, ECON 5712, ECON 5713	1.0
5. 0.5 credit in Data Science elective (which may be an additional course from the preceding list) approved by the M.A. Supervisor of the Department of Economics	0.5
Total Credits	4.0

Requirements - Thesis option (4.0 credits)

1. 1.5 credits in:	1.5
ECON 5020 [0.5] Microeconomic Theory	
ECON 5021 [0.5] Macroeconomic Theory	
ECON 5027 [0.5] Econometrics I	
2. 0.5 credit in:	0.5
DATA 5000 [0.5] Data Science Seminar	
3. 1.5 credit in:	1.5
ECON 5909 [1.5] M.A. Thesis	
on a data science topic approved by the Data Science governance committee	
4. 0.5 credit from:	0.5
ECON 5055 [0.5] Financial Econometrics	
ECON 5361 [0.5] Labour Economics I	
ECON 5362 [0.5] Labour Economics II	
ECON 5700 [0.5] Social and Economic Measurement	
ECON 5712 [0.5] Micro-Econometrics	
ECON 5713 [0.5] Time-Series Econometrics	
Total Credits	4.0

M.A.Sc. Electrical and Computer Engineering with Specialization in Data Science (5.0 credits)

Requirements - by Thesis (5.0 credits)

1. 0.5 credit in:	0.5
DATA 5000 [0.5] Data Science Seminar	
2. 0.5 credit from data science elective courses:	0.5
SYSC 5001 [0.5] Simulation and Modeling	
SYSC 5003 [0.5] Discrete Stochastic Models	
SYSC 5004 [0.5] Optimization for Engineering Applications	
SYSC 5101 [0.5] Design of High Performance Software	
SYSC 5103 [0.5] Software Agents	
SYSC 5104 [0.5] Methodologies For Discrete-Event Modeling And Simulation	
SYSC 5201 [0.5] Computer Communication	
SYSC 5207 [0.5] Distributed Systems Engineering	
SYSC 5300 [0.5] Advanced Health Care Engineering	
SYSC 5303 [0.5] Interactive Networked Systems and Telemedicine	
SYSC 5306 [0.5] Mobile Computing Systems	

SYSC 5401 [0.5] Adaptive and Learning Systems	
SYSC 5404 [0.5] Multimedia Compression, Scalability, and Adaptation	
SYSC 5405 [0.5] Pattern Classification and Experiment Design	
SYSC 5407 [0.5] Planning and Design of Computer Networks	
SYSC 5500 [0.5] Designing Secure Networking and Computer Systems	
SYSC 5703 [0.5] Integrated Database Systems	
SYSC 5706 [0.5] Analytical Performance Models of Computer Systems	
3. 1.5 credits in courses	1.5
4. 2.5 credits in:	2.5
SYSC 5909 [2.5] M.A.Sc. Thesis	
in the area of data science (each candidate submitting a thesis will be required to undertake an oral defence of the thesis)	
Total Credits	5.0

M. Sc. Geography with Specialization in Data Science (5.0 credits)

Requirements

1. 0.5 credit in:	0.5
DATA 5000 [0.5] Data Science Seminar	
2. 0.5 credit in:	0.5
GEOG 5001 [0.5] Modeling Environmental Systems	
3. 0.5 credit in:	0.5
GEOG 5905 [0.5] Masters Research Workshop	
4. 1.0 credit in Physical Geography selected from:	1.0
GEOG 5002 [0.5] Quantitative Analysis for Geographical Research	
GEOG 5103 [0.5] Hydrologic Principles and Methods	
GEOG 5104 [0.5] Advanced Biogeography	
GEOG 5107 [0.5] Field Study and Methodological Research	
GEOG 5303 [0.5] Geocryology	
GEOG 5307 [0.5] Soil Resources	
GEOG 5803 [0.5] Seminar in Geomatics	
GEOG 5804 [0.5] Geographic Information Systems	
GEOG 5900 [0.5] Graduate Tutorial	
up to 0.5 credit in GEOG or GEOM at the 4000 level, with departmental approval	
5. 2.5 credits in:	2.5
GEOG 5906 [2.5] M.Sc. Thesis (Thesis must be in the area of Data Science, defended at an oral examination)	
Total Credits	5.0

M.Sc. Health Sciences with Specialization in Data Science (5.5 credits)

Requirements (5.5 credits)

1. 1.0 credits in:	1.0
HLTH 5901 [0.5] Advanced Topics in Interdisciplinary Health Sciences	
HLTH 5902 [0.5] Seminars in Interdisciplinary Health Sciences for MSc	
2. 0.5 credits in:	0.5
DATA 5000 [0.5] Data Science Seminar	

3. Completion of:

HLTH 5905 [0.0]	Final Research Seminar Presentation for MSc
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4. 4.0 credits in: 4.0

HLTH 5909 [4.0]	MSc Thesis
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5. Twice-yearly meetings with the thesis Graduate Advisory Committee, with students meeting a level of progress as determined by the Committee.

Total Credits 5.5

Note: The final research seminar presentation must be completed within one month of the thesis defence.