PHYSICAL GEOGRAPHY, B.SC. HONOURS

Bachelor of Science in Physical Geography

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Program Information

Physical Geography includes the study of the environment through aspects of atmospheric science, geomorphology, biogeography, and hydrology, all of which draw upon the natural and applied sciences to understand the natural environment. Atmospheric sciences examine the physical and biophysical processes at and near the earth's surface shaping climate and determining the weather. These processes are examined over cascading scales, local to global. Hydrology studies the flow of water between the Earth's surface and the atmosphere, including the quantity and quality of water resources as well as the spatial variability in the hydrologic cycle. The examination of processes at the earth's surface and the associated landforms is called geomorphology. Various sub-disciplines in geomorphology include weathering and erosional processes, volcanoes, glacial and river systems. Biogeography studies the interrelationships between the biospheric environment and the physical environment. Formation of soils, ecosystem and biome cycles and components, as well as human interaction with the physical environment are all topical areas in biogeography.

Geomatics is an emerging field referring to the techniques of spatial data acquisition, handling, and analysis. Included within this field have been geographic applications of computer analysis and spatial modeling, spatial statistics, remote sensing technology, and geographic information systems. Many of these techniques have their origins in the applied sciences, but both physical and human geographers have contributed greatly to their development and application. The application of such methodologies in geographic fields, such as resource management, urban geography, climate change, and applied geography has also provided closer co-operation between human and physical geography, as well as promoting considerable interdisciplinary research with other University disciplines.

The Major and Honours B.Sc. degree programs in Physical Geography serve students who desire advanced study in the academic subject matter of various themes contained within Physical Geography. The Honours program in particular is intended for students interested in the opportunity for exposure to advanced geographic research. As such, the Honours program demands higher academic performance. Students who are ineligible to enter Honours in their second year may establish this in the following year on the basis of their improved scholastic performance. The degree programs may be pursued on a full or part-time basis.

MINOR IN ANOTHER DEPARTMENT

Students in the B.Sc. Physical Geography have the opportunity to complete a Minor in a subject field that is different than that of the declared Major, and which normally consist of 18 credit hours from a department offering this option at the University of Manitoba. Students in the B.Sc. Physical Geography are not permitted to complete a Minor in Geography. Students can declare only one Minor. The Minor requirements are described in the Faculty Regulations (https://catalog.umanitoba.ca/undergraduate-studies/environment-earth-resources/#facultyacademicregulationstext). Contact a Riddell Faculty student advisor (https://umanitoba.ca/environment-earth-resources/student-experience/#:~:text=Aid%20and%20Awards-,Academic%20advisors,-Academic%20advisors%20are) in the Faculty Dean's Office for further information about eligible Minors.

STREAMS

Students are required to complete a stream approved by a Riddell Faculty student advisor. Students in the Major or Major (Coop) programs are required to complete a minimum of 30 credit hours of 2000- (or higher) level courses, of which at least 18 credit hours must be at or above the 3000-level. The B.Sc. Honours and Honours (Coop) programs require students to complete 39 credit hours in a Stream, of which at least 24 credit hours are defined at or above the 3000-level and must include GEOG 4660. Streams are currently available in *Atmospheric and Hydrological Sciences, Geomatics and Physical Geography*. See a Riddell Faculty student advisor (https://umanitoba.ca/environment-earth-resources/student-experience/#:~:text=Aid%20and%20Awards-,Academic%20advisors,-Academic%20advisors%20are) for current information about these Streams.

MAJOR

To qualify for the degree, Bachelor of Science in Physical Geography (Major), a student must complete 120 credit hours with passing grades ('D' or better) and a minimum degree grade point average of 2.00. Major (Coop) students must attain a minimum degree Grade Point Average of 2.50. Students must complete all faculty requirements. There is no limit to the number of credit hours a student completes provided he/she does not exceed 18 credit hours of failed courses.

HONOURS

To qualify for the degree Bachelor of Science in Physical Geography (Honours and Honours Coop), a student must complete 120 credit hours with passing grades ('D' or better) and a minimum degree grade point average of 3.00 in the courses that constitute the degree. Students must complete all faculty requirements. There is no limit to the number of credit hours a student completes provided he/she does not exceed 18 credit hours of failed courses.

Advanced Entry Requirements

Advanced Entry students are placed in the Major degree program until they have completed a minimum of 48 credit hours after which they may transfer to the Honours program or remain in the Major. To make a program transfer, students must consult a Riddell Faculty student advisor (https://umanitoba.ca/environment-earth-resources/student-experience/#:~:text=Aid%20and%20Awards-,Academic%20advisors,-Academic%20advisors%20are).

ADVANCED ENTRY REQUIREMENTS

Advanced Entry students are placed in the Major degree program until they have completed a minimum of 48 credit hours after which they may transfer to the Honours program or remain in the Major. To make a program transfer, students must consult a Riddell Faculty student advisor (https://umanitoba.ca/environment-earth-resources/student-experience/#:~:text=Aid%20and%20Awards-,Academic%20advisors,-Academic

%20advisors%20are). (https://umanitoba.ca/faculties/environment/undergraduate/advice/)

Degree Program in Physical Geography: Honours

Minimum Number of Credit Hours: 48
Minimum Degree Grade Point Average: 3.00
Additional Entrance Requirements: A grade of 'B' or better in GEOG 1290[1]; a grade of 'C+' or better in 12 credit hours from:

Course	Title	Hours
GEOL 1340	The Dynamic Earth	3
PHYS 1020	General Physics 1	3
or PHYS 1050	Physics 1: Mechanics	
MATH 1500	Introduction to Calculus	3
PHYS 1030	General Physics 2	3
or PHYS 1070	Physics 2: Waves and Modern Physics	
MATH 1300	Vector Geometry and Linear Algebra	3
or MATH 1310	Matrices for Management and Social Sciences	

1 Equivalent courses offered through Université de Saint-Boniface may be used in lieu of the specified courses identified in the degree program chart. Université de Saint-Boniface courses end in the number 1.
2 MATH 1510 may be used in lieu of MATH 1500

Degree Program in Physical Geography: Honours (Coop) [1]

Minimum Number of Credit Hours: 60
Minimum Degree Grade Point Average: 3.0
Additional Entrance Requirements: ENVR 2900; students must satisfy the requirements for Entrance/continuation in the regular program and (normally) have completed:

Course	Title	Hours
GEOG 2200	Introduction to Thematic Cartography (TS)	3
GEOG 2300	Atmospheric Thermodynamics, Clouds and Precipitation (PS)	3
GEOG 2310	Introduction to Process Hydrology (PS)	3
GEOG 2550	Geomorphology (PS)	3
GEOG 3730	Geographic Information Systems (TS)	3
PHYS 1020	General Physics 1 [2]	3
or PHYS 1050	Physics 1: Mechanics	
PHYS 1030	General Physics 2	3
or PHYS 1070	Physics 2: Waves and Modern Physics	
MATH 1300	Vector Geometry and Linear Algebra [2]	3
or MATH 1310	Matrices for Management and Social Sciences	
MATH 1500	Introduction to Calculus [2,3]	3

1 Students may be permitted to enter the program without satisfying all requirements listed. Students should consult with the Cooperative Education Coordinator for further information.
2 Equivalent courses offered through Université de Saint-Boniface may be used in lieu of the specified courses identified in the degree program chart. Université de Saint-Boniface courses end in the number 1.
3 MATH 1510 may be used in lieu of MATH 1500.

Degree Program in Physical Geography: Major

Minimum Number of Credit Hours: 24
Minimum Degree Grade Point Average: 2.00
Additional Entrance Requirements: A grade of 'C' or better in GEOG 1290[1]; a grade of 'C+' or better in 6 credit hours from:

Course	Title	Hours
GEOL 1340	The Dynamic Earth	3
PHYS 1020	General Physics 1 [1]	3
or PHYS 1050	Physics 1: Mechanics	
MATH 1500	Introduction to Calculus [1,2]	3
PHYS 1030	General Physics 2	3
or PHYS 1070	Physics 2: Waves and Modern Physics	
MATH 1300	Vector Geometry and Linear Algebra [1]	3
or MATH 1310	Matrices for Management and Social Sciences	

1 Equivalent courses offered through Université de Saint-Boniface may be used in lieu of the specified courses identified in the degree program chart. Université de Saint-Boniface courses end in the number 1.
2 MATH 1510 may be used in lieu of MATH 1500.

Degree Program in Physical Geography: Major (Coop) [1]

Minimum Number of Credit Hours: 60
Minimum Degree Grade Point Average: 2.50
Additional Entrance Requirements: ENVR 2900; students must satisfy the requirements for Entrance/continuation in the regular program and (normally) have completed:

Course	Title	Hours
GEOG 2200	Introduction to Thematic Cartography (TS)	3
GEOG 2300	Atmospheric Thermodynamics, Clouds and Precipitation (PS)	3
GEOG 2310	Introduction to Process Hydrology (PS)	3
GEOG 2550	Geomorphology (PS)	3
GEOG 3730	Geographic Information Systems (TS)	3
PHYS 1020	General Physics 1 [2]	3
or PHYS 1050	Physics 1: Mechanics	
PHYS 1030	General Physics 2 [2]	3
or PHYS 1070	Physics 2: Waves and Modern Physics	
MATH 1300	Vector Geometry and Linear Algebra [2]	3
or MATH 1310	Matrices for Management and Social Sciences	
MATH 1500	Introduction to Calculus [2,3]	3

1 Students may be permitted to enter the program without satisfying all requirements listed. Students should consult with the Cooperative Education Coordinator for further information.
2 Equivalent courses offered through Université de Saint-Boniface may be used in lieu of the specified courses identified in the degree program chart. Université de Saint-Boniface courses end in the number 1.
3 MATH 1510 may be used in lieu of MATH 1500

Minimum Performance Requirements for Continuation and Graduation

A student's academic performance will be assessed with his/her application for admission to the Clayton H. Riddell Faculty of Environment, Earth, and Resources and following each term thereafter. A Riddell Faculty student advisor must approve a student's registration each Fall/Winter *term*. Any revisions in this schedule should also be approved prior to the end of the registration revision period.

To be in **good standing** and permitted to continue in a degree program, a student must achieve the minimum standards at each point of assessment. This assessment is based on the student's minimum degree Grade Point Average; the grades received in each of GEOG 1290 (or GEOG 1291), GEOG 2200, GEOG 2300, GEOG 2310, GEOG 2550, GEOG 3730, GEOG 3810; and the number of failed courses after admission to the Clayton H. Riddell Faculty of Environment, Earth, and Resources.

DEGREE PROGRAM (CREDIT HOURS): HONOURS (120)

Minimum Performance Requirements:

Minimum Degree Grade Point Average (DGPA): 3.00
Maximum Credit Hours of Failed Courses: 18
Physical Geography Core: Minimum Grade Requirements in GEOG 1290[1], GEOG 2200[1], GEOG 2300, GEOG 2310, GEOG 2272, GEOG 2550, GEOG 3730, GEOG 3810: 'B' in GEOG 1290; 'C+' grades in others

Graduation Requirements [2]

Stream (2000-Level or Higher): 39 credit hours of which at least 24 credit hours must be at the 3000-level or higher;

completion of GEOG 4660; minimum 'C+' grade in each course.

1. Equivalent courses offered through Université de Saint-Boniface may be used in lieu of the specified courses identified in the degree program chart. Université de Saint-Boniface courses end in the number 1.
2. B.Sc. Physical Geography students must successfully complete a minimum of 60 credit hours at the University of Manitoba to satisfy the Residence Requirement. The courses used to satisfy the requirement must be acceptable for credit in the Clayton H. Riddell Faculty of Environment, Earth, and Resources.

DEGREE PROGRAM (CREDIT HOURS): HONOURS COOP (120)

Minimum Performance Requirements:

Minimum Degree Grade Point Average (DGPA): 3.00
Maximum Credit Hours of Failed Courses: 18
Physical Geography Core: Minimum Grade Requirements in GEOG 1290[1], GEOG 2200[1], GEOG 2300, GEOG 2310, GEOG 2272, GEOG 2550, GEOG 3730, GEOG 3810: 'B' in GEOG 1290; 'C+' grades in others

Graduation Requirements [2]

Stream (2000-Level or Higher): 39 credit hours of which at least 24 credit hours must be at the 3000-level or higher;

completion of GEOG 4660; minimum 'C+' grade in each course.
Coop Option Courses:

Course	Title	Hours
ENVR 2900	Professional Development in the Environmental Sectors 1	1.5
ENVR 3900	Professional Development in the Environmental Sectors 2	1.5
ENVR 3910	Coop Work Term Report 1	1.5
ENVR 3980	Coop Work Term 1	0
ENVR 3920	Coop Work Term Report 2	1.5
ENVR 3990	Coop Work Term 2	0
ENVR 4910	Coop Work Term Report 3 (optional)	1.5
ENVR 4980	Work Term 3 (optional)	0

1. Equivalent courses offered through Université de Saint-Boniface may be used in lieu of the specified courses identified in the degree program chart. Université de Saint-Boniface courses end in the number 1.
2. B.Sc. Physical Geography students must successfully complete a minimum of 60 credit hours at the University of Manitoba to satisfy the Residence Requirement. The courses used to satisfy the requirement must be acceptable for credit in the Clayton H. Riddell Faculty of Environment, Earth, and Resources.

DEGREE PROGRAM (CREDIT HOURS): MAJOR (120)

Minimum Performance Requirements

Minimum Degree Grade Point Average (DGPA): 2.00
Maximum Credit Hours of Failed Courses: 18
Physical Geography Core: Minimum Grade Requirements in GEOG 1290[1], GEOG 2200[1], GEOG 2300, GEOG 2310, GEOG 2272, GEOG 2550, GEOG 3730, GEOG 3810: "C"

Graduation Requirements[2]

Stream (2000-Level or Higher): 30 credit hours of which at least 18 credit hours must be at the 3000-level or higher; minimum Degree GPA of 2.00.

1. Equivalent courses offered through Université de Saint-Boniface may be used in lieu of the specified courses identified in the degree program chart. Université de Saint-Boniface courses end in the number 1.
2. B.Sc. Physical Geography students must successfully complete a minimum of 60 credit hours at the University of Manitoba to satisfy the Residence Requirement. The courses used to satisfy the requirement must be acceptable for credit in the Clayton H. Riddell Faculty of Environment, Earth, and Resources.

DEGREE PROGRAM (CREDIT HOURS): MAJOR COOP (120)

Minimum Performance Requirements

Minimum Degree Grade Point Average (DGPA): 2.50
Maximum Credit Hours of Failed Courses: 18
Physical Geography Core: Minimum Grade Requirements in GEOG 1290[1], GEOG 2200[1], GEOG 2300, GEOG 2310, GEOG 2272, GEOG 2550, GEOG 3730, GEOG 3810: "C"

Graduation Requirements [2]

Stream (2000-Level or Higher): 30 credit hours of which at least 18 credit hours must be at the 3000-level or higher; minimum Degree GPA of 2.00.
Coop Option Courses:

Course	Title	Hours
ENVR 2900	Professional Development in the Environmental Sectors 1	1.5
ENVR 3900	Professional Development in the Environmental Sectors 2	1.5
ENVR 3910	Coop Work Term Report 1	1.5
ENVR 3980	Coop Work Term 1	0
ENVR 3920	Coop Work Term Report 2	1.5
ENVR 3990	Coop Work Term 2	0
ENVR 4910	Coop Work Term Report 3 (optional)	1.5
ENVR 4980	Work Term 3 (optional)	0

1. Equivalent courses offered through Université de Saint-Boniface may be used in lieu of the specified courses identified in the degree program chart. Université de Saint-Boniface courses end in the number 1.

[2] B.Sc. Physical Geography students must successfully complete a minimum of 60 credit hours at the University of Manitoba to satisfy the Residence Requirement. The courses used to satisfy the requirement must be acceptable for credit in the Clayton H. Riddell Faculty of Environment, Earth, and Resources.

To **graduate** from the Bachelor of Science in Physical Geography with the intended degree designation, a student must achieve the minimum standards and graduation requirements outlined above following the final term of registration and satisfy all degree course requirements in the foundation, physical geography core and Stream.

Students in the Honours program who do not meet these minimum performance requirements for continuation or graduation will be withdrawn from the degree program and placed in the Major provided they are eligible based on their performance. Students who do not meet the minimum performance requirements of the Major will be placed on academic warning, probation or academic suspension as defined in Academic Warning, Probation, Academic Suspension and Special Students (Academic Standing) (https://catalog.umanitoba.ca/undergraduate-studies/environment-earth-resources/#facultyacademicregulationstext).

Students withdrawn from the Honours program as a result of their inability to meet minimum performance requirements will have the notation, 'Required to Withdraw from the Honours Program,' recorded on their transcript. Similarly, students withdrawn from the Major program will have the notation, 'Required to Withdraw from the Major Program,' recorded on their transcript.

Graduating with Distinction or First Class Honours

WITH DISTINCTION

Students graduating with a B.Sc. Physical Geography (Major) degree will have their degree granted 'With Distinction' if they have a minimum Degree Grade Point Average of 3.50 on all course work.

The term 'Degree with Distinction' will appear both on the parchment and on the student's transcript.

FIRST CLASS HONOURS

Students in the Honours program will have their degree granted with 'First Class Honours' if they have a minimum Degree Grade Point Average of 3.50 based on all acceptable course work. The term First Class Honours will appear both on the parchment and on the student's transcript.

Degree Requirements

The courses required in this program will satisfy the University Mathematics requirement. (https://catalog.umanitoba.ca/undergraduate-studies/general-academic-regulations/#Residence-Written-English)

Equivalent courses offered through Université de Saint-Boniface may be used in lieu of the specified courses identified in the degree program chart.

Course	Title	Hours
Year 1		
GEOG 1290	Introduction to Physical Geography	3
PHYS 1020	General Physics 1 [1]	3
MATH 1500	Introduction to Calculus [2]	3
6 credit hours from the Faculty of Arts		6
	Hours	**15**
Years 1-3		
21 credit hours from the following:		21
PHYS 1030	General Physics 2 [1]	
MATH 1300	Vector Geometry and Linear Algebra [2]	
GEOL 1340	The Dynamic Earth	
COMP 1012	Computer Programming for Scientists and Engineers	
CHEM 1100	Introductory Chemistry 1: Atomic and Molecular Structure and Energetics [3]	
CHEM 1110	Introductory Chemistry 2: Interaction, Reactivity, and Chemical Properties [3]	
CHEM 1120	Introduction to Chemistry Techniques [3]	
STAT 1000	Basic Statistical Analysis 1 [4]	
STAT 2000	Basic Statistical Analysis 2	
BIOL 1020	Biology 1: Principles and Themes [5]	
BIOL 1030	Biology 2: Biological Diversity, Function and Interactions [5]	
MATH 1700	Calculus 2 [2]	
	Hours	**21**
Year 2		
GEOG 2200	Introduction to Thematic Cartography (TS)	3
GEOG 2300	Atmospheric Thermodynamics, Clouds and Precipitation (PS)	3
GEOG 2310	Introduction to Process Hydrology (PS)	3
GEOG 2540	Weather and Climate (PS)	3
GEOG 2550	Geomorphology (PS)	3
ENVR 2810	Environmental Critical Thinking and Scientific Research [6]	3
	Hours	**18**
Years 3-4		
GEOG 2272	Natural Hazards (PS) [7]	3
GEOG 3730	Geographic Information Systems (TS)	3
GEOG 3810	Quantitative Research Methods in Geography (TS) [8]	3
GEOG 4660	Honours Thesis	6
33 credit hours in an approved Stream [9]		33
18 credit hours of electives		18
	Hours	**66**
	Total Hours	**120**

[1] PHYS 1050 and PHYS 1070 may be used in lieu of PHYS 1020 and PHYS 1030, respectively.

[2] MATH 1230, MATH 1510 or MATH 1520 may be used in lieu of MATH 1500; or MATH 1690 may be used in place of MATH 1500 (or equivalent) and MATH 1700; or MATH 1310 may be used in lieu of MATH 1300; or MATH 1232 or MATH 1710 may be used in lieu of MATH 1700.

[3] The former CHEM 1300 and 1310 may be used in lieu of CHEM 1100, CHEM 1110 and CHEM 1120. CHEM 1122 and CHEM 1126 may be used in lieu of CHEM 1120.

[4] STAT 1150 may be used in lieu of STAT 1000.

[5] BIOL 1000 and BIOL 1010 may be used in lieu of BIOL 1020 and BIOL 1030.

[6] The former GEOG 2530 may be used in lieu of ENVR 2810.
[7] The former GEOG 2440 may be used in lieu of GEOG 2272.
[8] The former GEOG 3680 may be used in lieu of GEOG 3810.
[9] A **Stream** must be approved by a Riddell Faculty student advisor. Honours Stream requirements are as follows: 33 credit hours of 2000- (or higher) level courses, of which 24 credit hours must be at the 3000- or 4000-level.

Entrance into the degree programs is summarized in the Overview (p. 2).

The W course (https://catalog.umanitoba.ca/undergraduate-studies/general-academic-regulations/#Residence-Written-English) must be completed within the first 60 credit hours of courses.

Note:

To fulfil prerequisite requirements a grade of 'C' must be achieved, unless otherwise stated, in any course stipulated as a prerequisite to a further course.

- Students should review the course topics available for GEOG 3740, GEOG 3750, GEOG 3760, GEOG 3770 *and* GEOG 4670. Also, all courses are not offered every year. The course schedule for the current academic term is available from the Class Schedule in Aurora.
- Students registering in certain courses may be required to participate in field trips or field components and pay a portion of the associated expenses. For details, contact the Department of Environment and Geography (https://umanitoba.ca/environment-earth-resources/environment-and-geography/#about-us) general office.

Important: The Honours and Major programs need not be completed in the course order described in the chart above. The chart indicates one possible arrangement of the required courses and is meant to be a guide around which students can plan their program.

Honours Cooperative Option [1]

The courses required in this program will satisfy the University Mathematics requirement (https://catalog.umanitoba.ca/undergraduate-studies/general-academic-regulations/#Residence-Written-English).

Equivalent courses offered through Université de Saint-Boniface may be used in lieu of the specified courses identified in the degree program chart.

Course	Title	Hours
Year 1		
GEOG 1290	Introduction to Physical Geography	3
PHYS 1020	General Physics 1 [2]	3
MATH 1500	Introduction to Calculus [3]	3
6 credit hours from the Faculty of Arts		6
	Hours	**15**
Years 1-3		
21 credit hours from the following:		21
PHYS 1030	General Physics 2 [2]	
MATH 1300	Vector Geometry and Linear Algebra [3]	
GEOL 1340	The Dynamic Earth	
COMP 1012	Computer Programming for Scientists and Engineers	
CHEM 1100	Introductory Chemistry 1: Atomic and Molecular Structure and Energetics [4]	
CHEM 1110	Introductory Chemistry 2: Interaction, Reactivity, and Chemical Properties [4]	
CHEM 1120	Introduction to Chemistry Techniques [4]	
STAT 1000	Basic Statistical Analysis 1 [5]	
STAT 2000	Basic Statistical Analysis 2	
BIOL 1020	Biology 1: Principles and Themes [6]	
BIOL 1030	Biology 2: Biological Diversity, Function and Interactions [6]	
MATH 1700	Calculus 2 [3]	
	Hours	**21**
Year 2		
GEOG 2200	Introduction to Thematic Cartography (TS)	3
GEOG 2300	Atmospheric Thermodynamics, Clouds and Precipitation (PS)	3
GEOG 2310	Introduction to Process Hydrology (PS)	3
GEOG 2540	Weather and Climate (PS)	3
GEOG 2550	Geomorphology (PS)	3
ENVR 2810	Environmental Critical Thinking and Scientific Research [7]	3
ENVR 2900	Professional Development in the Environmental Sectors 1	1.5
ENVR 3980	Coop Work Term 1	0
ENVR 3910	Coop Work Term Report 1	1.5
	Hours	**21**
Years 3-4		
GEOG 2272	Natural Hazards (PS) [8]	3
GEOG 3730	Geographic Information Systems (TS)	3
GEOG 3810	Quantitative Research Methods in Geography (TS) [9]	3
GEOG 4660	Honours Thesis	6
ENVR 3900	Professional Development in the Environmental Sectors 2	1.5
ENVR 3990	Coop Work Term 2	0
ENVR 3920	Coop Work Term Report 2	1.5
ENVR 4980	Work Term 3 (optional) [10]	
ENVR 4910	Coop Work Term Report 3 (optional) [10]	
33 credit hours in an approved Stream [11]		33
12 credit hours of electives		12
	Hours	**63**
	Total Hours	**120**

[1] Entrance into the degree programs is summarized in the Overview (p. 2).
[2] PHYS 1050 and PHYS 1070 may be used in lieu of PHYS 1020 and PHYS 1030, respectively.
[3] MATH 1230, MATH 1510 or MATH 1520 may be used in lieu of MATH 1500; or MATH 1690 may be used in place of MATH 1500 (or equivalent) and MATH 1700; or MATH 1310 may be used in lieu of MATH 1300; or MATH 1232 or MATH 1710 may be used in lieu of MATH 1700.
[4] The former CHEM 1300 and 1310 may be used in lieu of CHEM 1100, CHEM 1110 and CHEM 1120. CHEM 1122 and CHEM 1126 may be used in lieu of CHEM 1120.

[5] STAT 1150 may be used in lieu of STAT 1000.
[6] BIOL 1000 and BIOL 1010 may be used in lieu of BIOL 1020 and BIOL 1030.
[7] The former GEOG 2530 may be used in lieu of ENVR 2810.
[8] The former GEOG 2440 may be used in lieu of GEOG 2272.
[9] The former GEOG 3680 may be used in lieu of GEOG 3810.
[10] Students in the cooperative education option who complete ENVR 4980 and ENVR 4910 will graduate with an additional 1.5 degree credits for a total of 121.5 credits hours.
[11] A **Stream** must be approved by a Riddell Faculty student advisor. Honours Stream requirements are as follows: 33 credit hours of 2000- (or higher) level courses, of which 24 credit hours must be at the 3000- or 4000-level.

The W course (https://catalog.umanitoba.ca/undergraduate-studies/general-academic-regulations/#Residence-Written-English) must be completed within the first 60 credit hours of courses.

Note:

To fulfil prerequisite requirements a grade of 'C' must be achieved, unless otherwise stated, in any course stipulated as a prerequisite to a further course.

- Students should review the course topics available for GEOG 3740, GEOG 3750, GEOG 3760, GEOG 3770 *and* GEOG 4670. Also, all courses are not offered every year. The course schedule for the current academic term is available from the Class Schedule in Aurora.
- Students registering in certain courses may be required to participate in field trips or field components and pay a portion of the associated expenses. For details, contact the Department of Environment and Geography (https://umanitoba.ca/environment-earth-resources/environment-and-geography/#about-us) general office.

Important: The Honours and Major programs need not be completed in the course order described in the chart above. The chart indicates one possible arrangement of the required courses and is meant to be a guide around which students can plan their program.

Cooperative Education Option

A Cooperative Education Option (https://umanitoba.ca/environment-earth-resources/coop/) is available to students registered in either the Major or Honours degree programs in Environmental Science, Environmental Studies, or Physical Geography. Coop is an arrangement whereby students spend alternating periods in university and employment. There are several advantages to a cooperative education program for students. One benefit is that students are able to acquire both theoretical knowledge and practical experience. This experience assists them in selecting areas of specialization for their senior courses in their chosen Focus Area or Stream. As well, Coop assists students in their professional development by enhancing networking opportunities, participation in conferences and workshops and provides the foundation of skills and strategies required in searching and acquiring employment after graduation. Students can also defray some of the costs of their university education through these work term placements. Further information about Cooperative Education and student eligibility is available from the Coop Placement Coordinator (https://umanitoba.ca/environment-earth-resources/coop/) available in the Faculty general office.

Students electing to participate in the Cooperative Education Option will be assessed a program fee with their formal admission into the program. Once a student has accepted a position with a Coop employer, no portion of the program fee will normally be refunded.

The Cooperative Education Option consists of two employment work terms, each over a minimum period of four months, and contributes 6 credit hours towards the four year degree program. Students complete ENVR 2900, ENVR 3900, work term placements ENVR 3980, ENVR 3990, and the work term report courses ENVR 3910 and ENVR 3920. Additional work terms are available to interested students. Each academic term and each employment term commence in January, May or September. While on an employment term, a Cooperative Education Option student is not permitted to take more than three additional credit hours of academic work outside of the requirements of the Coop placement without permission of a Riddell Faculty student advisor.

Students are required to register in the appropriate Coop courses and pay course fees prior to beginning their placement.

For more information, please visit the Riddell Faculty Co-operative Education Program (https://umanitoba.ca/environment-earth-resources/coop/) webpage.