GEOGRAPHY (GEOG)

Updated March 14, 2014

Note: The department/program code GEOG replaces the former code 23. Students cannot hold credit in GEOG-xxxx and the former 23.xxxx having the same course number (e.g., GEOG-1102(3) and 23.1102(3)).

Chair: Professor Marc Vachon; Professors: E. Cloutis,; Associate Professor: J. Binyamin, B. Buhay, J. Distasio, P. Fitzpatrick, I. Mauro; Assistant Professors: M. Dyce, C. Storie; J. Storie, G. Sylvestre; Instructors: B.R. McGregor, M. Krawetz; Cartographer: W. Hiebert; Lab Technician: K. Monson; Map Librarian: B. Russell; Department Assistant: Tania Guevara Sandoval; Adjunct Professor: L. Fishback.

DEGREES/PROGRAMS OFFERED

3-Year BA
4-Year BA
4-Year BA (UW/RRC)
Honours BA
3-Year BSc
3-Year BSc (Business Stream)
4-Year BSc
4-Year BSc (Business Stream)
4-Year BSc (UW/RRC)
Honours BSc
Minor - Human Geography
Minor - Physical Geography

INTRODUCTION

The study of Geography is concerned with the Earth in two ways - as the science of interaction between natural elements of the environment, such as weather, plants, soils, and landforms and, secondly, as the science of the distribution and activities of the Earth's population in response to various social and environmental factors. Systematic studies in Geography examine the locations, distributions, arrangements, and associations between groups of interrelated features. In contrast, regional studies examine the totality of geographic phenomena in a particular area. No matter what approach is taken, there are certain skills and techniques that are of particular geographic relevance (e.g., remote sensing, cartography, Geographic Information Systems).

As a reflection of the diversity that exists within the study of Geography and the special skills required, the Department offers courses within five areas of study: General, Physical Geography, Geomatics (formerly Techniques), Systematic Human Geography, and Regional Geography. One may earn either the 3-Year or 4-Year Bachelor's degree in either Arts or Science, as well as the BA Honours or BSc Honours degree. Students pursuing a 3-year or 4-year BSc also have the opportunity to take a Business Stream – a set of core courses in the Faculty of Business that will provide them with the skills needed to enter and succeed in industry and business. See the "Science with a Business Stream" section of this Course Calendar. Students may also earn a 4-Year BA or BSc degree in a joint program in Geography/Geographic Information Systems with Red River College.

Geography offers a considerable variety of career opportunities. High schools require a continuing supply of Geography teachers. Various federal and provincial agencies dealing with conservation, urban planning, recreation, landscape architecture, and resource use also provide opportunities, especially to those with Honours or graduate work in Geography. Undergraduate training in the subject is often required for certain business careers, especially in surveying, market assessment, and location and general commercial development. Training in Geographical Information Systems is especially in demand.

REQUIREMENTS FOR A 3-YEAR BA IN GEOGRAPHY

ADMISSION REQUIREMENT	Students must consult with a member of the Department in planning their course of study.
GRADUATION REQUIREMENT	90 credit hours
RESIDENCE REQUIREMENT	
Degree:	Minimum 30 credit hours
Major:	Minimum 18 credit hours
GENERAL DEGREE REQUIREMENT	
Humanities:	12 credit hours in Humanities
Science:	6 credit hours in Science
Writing:	Minimum 3 credit hours of Academic Writing.
Maximum Introductory Courses:	Students may use a maximum of 42 credit hours at the 1000 level. Of these, maximum of 6 credit hours may be below the 1000 level.
Distribution:	Minimum three (3) credit hours from each of five (5) different subjects.
MAJOR REQUIREMENT	
Single Major:	Minimum 30 credit hours/Maximum 48 credit hours.
Double Major:	30 credit hours in Geography and specified number of credit hours in other Major subject or program.

Required Courses:

Common Geography Requirement (12 credit hours)
- **GEOG-1102(3)** Introductory Human Geography I: People, Culture and Environment
- **GEOG-1103(3)** Introductory Human Geography II: Population, Place and Development
- **GEOG-1201(3)** Introductory Atmospheric Science
- **GEOG-1202(3)** Introductory Earth Science

Regional Geography Requirement (6 credit hours)
Minimum of 6 credit hours from among the following:
- **GEOG-2503(3)** Manitoba's Physical and Human Environments
- **GEOG-3216(3)** Arctic Environments
- **GEOG-3508(3)** Geographical Issues in the Developing World
- **GEOG-3509(3)** Canada's Physical and Human Environments
- **GEOG-3510(3)** Prairie Landscapes
- **GEOG-3511(3)** Topical Regions in Geography
- **GEOG-3512(3)** The Human Geography of Northern Canada

Systematic Human Geography Requirement (6 credit hours)
Minimum of 6 credit hours in Systematic Human Geography

Electives (6 credit hours)
Minimum 6 additional credit hours from any area of Geography

Combined Major:	Minimum 48 credit hours from 2 different Majors with not less than 18 credit hours from each major subject

Prescribed Courses:
- **GEOG-1102(3)** Introductory Human Geography I: People, Culture and Environment
- **GEOG-1103(3)** Introductory Human Geography II: Population, Place and Development
- **GEOG-1201(3)** Introductory Atmospheric Science
- **GEOG-1202(3)** Introductory Earth Science
- 6 additional credit hours from the Systematic Human Geography Group

REQUIREMENTS FOR A 3-YEAR BSc IN GEOGRAPHY

ADMISSION REQUIREMENT	Students must consult with a member of the Department in planning their course of study.
GRADUATION REQUIREMENT	90 credit hours
RESIDENCE REQUIREMENT	
Degree:	Minimum 30 credit hours
Major:	Minimum 18 credit hours
GENERAL DEGREE REQUIREMENT	
Humanities:	12 credit hours in Humanities
Writing:	Minimum 3 credit hours of Academic Writing.
Maximum Introductory Courses:	Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level.
Distribution:	Minimum three (3) credit hours from each of five (5) different subjects.
MAJOR REQUIREMENT	
Single Major:	Minimum 36 credit hours/Maximum 48 credit hours.
Double Major:	Minimum 36 credit hours in Geography and specified number of credit hours in other Major subject or program.

Required Courses:

Common Geography Requirement (12 credit hours)
- **GEOG-1102(3)** Introductory Human Geography I: People, Culture and Environment
- **GEOG-1103(3)** Introductory Human Geography II: Population, Place and Development
- **GEOG-1201(3)** Introductory Atmospheric Science
- **GEOG-1202(3)** Introductory Earth Science

Physical Geography/Geomatics Requirement (24 credit hours)
- **GEOG-2304(3)** Computer Mapping or **GEOG-2309(3)** Statistical Techniques in Environmental Analysis

12 credit hours from among:
- **GEOG-2207(3)** Climatology
- **GEOG-2210(3)** Meteorology
- **GEOG-2213(3)** Introductory Soil Science
- **GEOG-2214(3)** Soil-Vegetation Systems
- **GEOG-2215(3)** Mineralogy and Petrology
- **GEOG-2216(3)** Physical Geology

GEOG-2218(3) Fluvial and Hillslope Processes
GEOG-2219(3) Glacial and Periglacial Processes
GEOG-3210(3) Hydrology

Minimum 9 additional credit hours from the Physical Geography or Geomatics groups (i.e., where the second digit of the course number is a 2 or 3)

External Science Requirement (18 credit hours)
Minimum of 18 credit hours selected from at least two (2) of the Departments of Biology, Applied Computer Science, Chemistry, Mathematics, Physics, and Statistics.

The following courses do *not* qualify:
ACS-1453(3) Introduction to Computers
ACS-1803(3) Introduction to Computer-based Systems
BIOL-1102(6) Biology and Human Concerns
BIOL-1103(6) Human Biology
BIOL-1005(6) Concepts in Science
BIOL-1106(3) Environmental Biology
CHEM-0100(3) Foundations of Chemistry
CHEM-1801(3) Headline Chemistry
CHEM-2801(3) Chemistry and Society

MATH-0001(6) Basic Mathematics
MATH-0005(3) Introductory Mathematics
MATH-2901(3) History of Calculus
MATH-2903(3) Mathematics for Early/Middle Years Teachers
MULT-1005(6) Concepts in Science
PHYS- 1005(6) Concepts in Science
PHYS-1501(6) Modern Technology
PHYS-1701(6) Astronomy
PHYS-2705(6) Cosmology: Science Fact to Science Fiction
PHYS-2812(3) The Physics of Music

Combined Major: Minimum 48 credit hours from 2 different Majors with not less than 18 credit hours from each major subject

Prescribed Courses:
GEOG-1102(3) Introductory Human Geography I: People, Culture and Environment
GEOG-1103(3) Introductory Human Geography II: Population, Place and Development
GEOG-1201(3) Introductory Atmospheric Science
GEOG-1202(3) Introductory Earth Science
6 additional credit hours from the Physical Geography Group

REQUIREMENTS FOR THE 3-YEAR BSc IN GEOGRAPHY WITH A BUSINESS STREAM

Students must complete the requirements of the 3-year BSc in Geography degree (see previous section) and the set of core courses indicated in the "Science with a Business Stream" section of the Calendar.

REQUIREMENTS FOR A 4-YEAR BA IN GEOGRAPHY

ADMISSION REQUIREMENT Students must consult with the Department Advisor in planning their studies.

GRADUATION REQUIREMENT 120 credit hours

RESIDENCE REQUIREMENT

Degree:	Minimum 60 credit hours
Major:	Minimum 30 credit hours

GENERAL DEGREE REQUIREMENT

Humanities:	12 credit hours
Science:	6 credit hours
Social Science:	12 credit hours
Writing:	Minimum 3 credit hours of Academic Writing.
Maximum Introductory Courses:	Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level.
Distribution:	Minimum three (3) credit hours from each of five (5) different subjects.

MAJOR REQUIREMENT

Single Major:	Minimum 48 credit hours/Maximum 66 credit hours.

Double Major:	Minimum 48 credit hours in each Major subject as specified by the department/program.
Cognates:	Minimum of 18 credit hours/Maximum of 36 credit hours in ancillary courses. Maximum total of cognate and major courses is 84 credit hours combined.

Required Courses:

Common Geography Requirement (12 credit hours)
- **GEOG-1102(3)** Introductory Human Geography I: People, Culture and Environment
- **GEOG-1103(3)** Introductory Human Geography II: Population, Place and Development
- **GEOG-1201(3)** Introductory Atmospheric Science
- **GEOG-1202(3)** Introductory Earth Science

Regional Geography Requirement (6 credit hours) - Minimum of 6 credit hours from among the following:
- **GEOG-2503(3)** Manitoba's Physical and Human Environments
- **GEOG-3216(3)** Arctic Environments
- **GEOG-3508(3)** Geographical Issues in the Developing World
- **GEOG-3509(3)** Canada's Physical and Human Environments
- **GEOG-3510(3)** Prairie Landscapes
- **GEOG-3511(3)** Topical Regions in Geography
- **GEOG-3512(3)** The Human Geography of Northern Canada

Systematic Human Geography Requirement (6 credit hours)
Minimum of 6 credit hours in Systematic Human Geography

Geomatics Requirement (12 credit hours)
- **GEOG-2304(3)** Computer Mapping
- **GEOG-2306(3)** Introduction to Geographic Information Systems
- **GEOG-2309(3)** Statistical Techniques in Environmental Analysis
- **GEOG-3330(3)** Research Methods in Geography

Other Requirements
Students must complete 48 credit hours in Geography. Overall minimum of 12 credit hours of upper level (3000 and 4000) Systematic Human or Geomatics courses with a minimum of 6 credit hours at the 4000 level.

Combined Major:	Minimum 60 credit hours from two (2) different Majors with not less than 24 credit hours from each major subject.

Prescribed Courses:
- **GEOG-1102(3)** Introductory Human Geography I: People, Culture and Environment
- **GEOG-1103(3)** Introductory Human Geography II: Population, Place and Development
- **GEOG-1201(3)** Introductory Atmospheric Science
- **GEOG-1202(3)** Introductory Earth Science
- 6 additional credit hours from the Systematic Human Geography Group

REQUIREMENTS FOR A 4-YEAR BSc IN GEOGRAPHY

ADMISSION REQUIREMENT	Students must consult with the department advisor in planning their studies.
GRADUATION REQUIREMENT	120 credit hours, that is, 90 credit hours meeting the requirements for the 3-Year BSc plus an additional 30 credit hours.

RESIDENCE REQUIREMENT

Degree:	Minimum 60 credit hours
Major:	Minimum 30 credit hours

GENERAL DEGREE REQUIREMENT

Humanities:	12 credit hours
Writing:	Minimum 3 credit hours of Academic Writing.
Maximum Introductory Courses:	Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level.
Distribution:	Minimum three (3) credit hours from each of five (5) different subjects.

MAJOR REQUIREMENT

Single Major:	Minimum 57 credit hours/Maximum 78 credit hours.
Double Major:	Minimum 57 credit hours in Geography and specified number of courses in other Major.

Required Courses:

Common Geography Requirement (12 credit hours)
- **GEOG-1102(3)** Introductory Human Geography I: People, Culture and Environment
- **GEOG-1103(3)** Introductory Human Geography II: Population, Place and Development
- **GEOG-1201(3)** Introductory Atmospheric Science

GEOG-1202(3) Introductory Earth Science

Physical Geography/Geomatics Requirement (45 credit hours)
GEOG-2304(3) Computer Mapping
GEOG-2306(3) Introduction to Geographic Information Systems
GEOG-2309(3) Statistical Techniques in Environmental Analysis or STAT-1201(6) Introduction to Statistic Analysis
GEOG-2316(3) Remote Sensing
GEOG-3330(3) Research Methods in Geography

12 credit hours from among
GEOG-2207(3) Climatology
GEOG-2210(3) Meteorology
GEOG-2213(3) Introductory Soil Science
GEOG-2214(3) Soil-Vegetation Systems
GEOG-2215(3) Mineralogy and Petrology
GEOG-2216(3) Physical Geology
GEOG-2218(3) Fluvial and Hillslope Processes
GEOG-2219(3) Glacial and Periglacial Processes
GEOG-3210(3) Hydrology

18 additional credit hours from the Physical Geography or Geomatics groups
Overall minimum of 12 credit hours of upper level (3000 and 4000) Physical Geography or Geomatics courses with a minimum of 6 credit hours at the 4000 level.

External Science Requirement (24 credit hours)
Minimum of 24 credit hours selected from at least two (2) of the Departments of Biology, Applied Computer Science, Chemistry, Mathematics, Physics, and Statistics.

The following courses do *not* qualify:
ACS-1453(3) Introduction to Computers
ACS-1803(3) Introduction to Computer-based Systems
BIOL-1005(6) Concepts in Science
BIOL-1102(6) Biology and Human Concerns
BIOL-1103(6) Human Biology
BIOL-1106(3) Environmental Biology
CHEM-0100(3) Foundations of Chemistry
CHEM-1801(3) Headline Chemistry
CHEM-2801(3) Chemistry and Society

MATH-0001(6) Basic Mathematics
MATH-0005(3) Introductory Mathematics
MATH-2901(3) History of Calculus
MATH-2903(3) Mathematics for Early/Middle Years Teachers
MULT-1005(6) Concepts in Science
PHYS-1005(6) Concepts in Science
PHYS-1501(6) Modern Technology
PHYS-1701(6) Astronomy
PHYS-2705(6) Cosmology: Science Fact to Science Fiction
PHYS-2812(3) The Physics of Music

Combined Major: Minimum 60 credit hours from 2 different Majors with not less than 24 credit hours from each major subject.
Prescribed Courses:
GEOG-1102(3) Introductory Human Geography I: People, Culture and Environment
GEOG-1103(3) Introductory Human Geography II: Population, Place and Development
GEOG-1201(3) Introductory Atmospheric Science
GEOG-1202(3) Introductory Earth Science
6 additional credit hours from the Physical Geography Group

REQUIREMENTS FOR THE 4-YEAR BSc IN GEOGRAPHY WITH A BUSINESS STREAM

Students must complete the requirements of the 4-year BSc in Geography degree (see previous section) and the set of core courses indicated in the "Science with a Business Stream" section of the Calendar.

REQUIREMENTS FOR AN HONOURS BA IN GEOGRAPHY

ADMISSION REQUIREMENT

Entry into the program after completing a minimum of 30 credit hours.
Entry, continuing and graduation minimum GPA is 3.0 (B) in Honours Subject courses and 2.5 (C+) in Non-Honours Subject courses.
The minimum 3.0 GPA (B) will be based on all attempts (including course repeats and failures) in Honours Subject courses.
The minimum 2.5 GPA (C+) in all Non-Honours Subject courses will be calculated as for the general degree (i.e., Fs are not included, and in the case of repeated courses, only the highest grade will be used).

GRADUATION REQUIREMENT Minimum 120 credit hours

RESIDENCE REQUIREMENT

Degree:	Minimum 60 credit hours

GENERAL DEGREE REQUIREMENT

Humanities:	12 credit hours in Humanities
Science:	6 credit hours in Science
Writing:	Minimum 3 credit hours of Academic Writing.
Maximum Introductory Courses:	Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level.
Distribution:	Minimum three (3) credit hours from each of five (5) different subjects.

HONOURS REQUIREMENT

Single Honours:	Minimum 54 credit hours/Maximum 78 credit hours Minimum 21 credit hours in upper level (3000 and 4000) Honours subject courses of which a minimum of 15 credit hours must be at the 4000 level (including Thesis).
Double Honours:	Student must satisfy the requirements for both the Honours BA in Geography and the requirements for the Honours BA in the second Honours department in consultation with the Geography Department Chair.

Required Courses:

Common Geography Requirement (12 credit hours)

- **GEOG-1102(3)** Introductory Human Geography I: People, Culture and Environment
- **GEOG-1103(3)** Introductory Human Geography II: Population, Place and Development
- **GEOG-1201(3)** Introductory Atmospheric Science
- **GEOG-1202(3)** Introductory Earth Science

Regional Geography Requirement (6 credit hours)

Minimum of 6 credit hours from among the following

- **GEOG-2503(3)** Manitoba's Physical and Human Environments
- **GEOG-3216(3)** Arctic Environments
- **GEOG-3508(3)** Geographical Issues in the Developing World
- **GEOG-3509(3)** Canada's Physical and Human Environments
- **GEOG-3510(3)** Prairie Landscapes
- **GEOG-3511(3)** Topical Regions in Geography
- **GEOG-3512(3)** The Human Geography of Northern Canada

Systematic Human Geography Requirement (6 credit hours)

Minimum of 6 credit hours in Human Geography

Geomatics Requirement (12 credit hours)

- **GEOG-2304(3)** Computer Mapping
- **GEOG-2306(3)** Introduction to Geographic Information Systems
- **GEOG-2309(3)** Statistical Techniques in Environmental Analysis
- **GEOG-3330(3)** Research Methods in Geography

Thesis Requirement (6 credit hours)

- **GEOG-4901(6)** Honours Geography Thesis - 6 credit hours with a prerequisite of **GEOG-3330(3)** (Research Methods in Geography), 36 credit hours completed in Geography, and a Geography GPA of 3.0.

Other Requirements

Students must complete 54 credit hours in Geography.
Minimum 21 credit hours in upper level (3000 and 4000) Honours subject courses of which a minimum of 15 credit hours (including the thesis) must be at the 4000 level.
Average of 2.5 GPA in non-Geography courses and 3.00 GPA on all attempts in Geography courses (exit requirement).

REQUIREMENTS FOR AN HONOURS BSc IN GEOGRAPHY

ADMISSION REQUIREMENT

Entry into the program after completing a minimum of 30 credit hours.
Entry, continuing and graduation minimum GPA is 3.0 (B) in Honours Subject courses and 2.75 in Non-Honours Subject courses.
The minimum 3.0 GPA (B) will be based on all attempts (including course repeats and failures) in Honours Subject courses.
The minimum 2.75 GPA in all Non-Honours Subject courses will be calculated as for the general degree (i.e., Fs are not included, and in the case of repeated courses, only the highest grade will be used).

GRADUATION REQUIREMENT Minimum 120 credit hours

RESIDENCE REQUIREMENT

Degree: Minimum 60 credit hours

GENERAL DEGREE REQUIREMENT

Humanities: 12 credit hours in Humanities

Writing: Minimum 3 credit hours of Academic Writing.
Maximum Introductory Courses: Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level.
Distribution: Minimum three (3) credit hours from each of five (5) different subjects.

HONOURS REQUIREMENT

Single Honours: Minimum 63 credit hours/Maximum 78 credit hours
Minimum 30 credit hours in upper level (3000 and 4000) Honours Subject courses of which a minimum of 15 credit hours must be at the 4000 level (including Thesis).
Double Honours: Students must satisfy the requirements for both the Honours BSc in Geography and the requirements for the Honours BSc in the second Honours department, in consultation with the Geography Department Chair.

Required Courses

Common Geography Requirement (12 credit hours)
GEOG-1102(3) Introductory Human Geography I: People, Culture and Environment
GEOG-1103(3) Introductory Human Geography II: Population, Place and Development
GEOG-1201(3) Introductory Atmospheric Science
GEOG-1202(3) Introductory Earth Science

Physical Geography/Geomatics Requirements (45 credit hours)
GEOG-2304(3) Computer Mapping
GEOG-2306(3) Introduction to Geographic Information Systems
GEOG-2309(3) Statistical Techniques in Environmental Analysis
GEOG-2316(3) Remote Sensing
GEOG-3330(3) Research Methods in Geography

12 credit hours from the following:
GEOG-2207(3) Climatology
GEOG-2210(3) Meteorology
GEOG-2213(3) Introductory Soil Science
GEOG-2214(3) Soil-Vegetation Systems
GEOG-2215(3) Mineralogy and Petrology
GEOG-2216(3) Physical Geology
GEOG-2218(3) Fluvial and Hillslope Processes
GEOG-2219(3) Glacial and Periglacial Processes
GEOG-3210(3) Hydrology

Minimum of 18 additional credit hours of upper level (3000 and 4000) Physical Geography or Geomatics courses (excluding Thesis) with a minimum of 9 credit hours at the 4000 level (excluding Thesis).

Thesis Requirement (6 credit hours)
GEOG-4901(6) Honours Geography Thesis - 6 credit hours with a prerequisite of **GEOG-3330 (3)** (Research Methods in Geography), 36 credit hours completed in Geography, and a Geography GPA of 3.0

External Science Courses (24 credit hours)
Minimum of 24 credit hours selected from at least two(2) of the Departments of Biology, Applied Computer Science, Chemistry, Mathematics, Physics, and Statistics, of which 12 credit hours must be at or above the 2000-level.

The following courses do not qualify:
ACS-1453(3) Introduction to Computers
ACS-1803(3) Introduction to Computer-based Systems

BIOL-1005(6) Concepts in Science
BIOL-1102(6) Biology and Human Concerns
BIOL-1103(6) Human Biology
BIOL-1106(3) Environmental Biology
CHEM-0100(3) Foundations of Chemistry
CHEM-1801(3) Headline Chemistry
CHEM-2801(3) Chemistry and Society

MATH-0001(6) Basic Mathematics
MATH-0005(3) Introductory Mathematics
MATH-2901(3) History of Calculus
MATH-2903(3) Mathematics for Early/Middle Years Teachers
MULT-1005(6) Concepts in Science
PHYS-1005(6) Concepts in Science
PHYS-1501(6) Modern Technology
PHYS-1701(6) Astronomy
PHYS-2705(6) Cosmology: Science Fact to Science Fiction
PHYS-2812(3) The Physics of Music

Grade Point Requirement
GPA of 2.75 in non-Geography courses and 3.00 on all attempts in Geography courses (exit requirement).

Suggested Patterns:
Year 1: **GEOG-1102(3)** Introductory Human Geography I; **GEOG-1103(3)** Introductory Human Geography II; **GEOG-1201(3)** Introductory Atmospheric Science; **GEOG-1202(3)** Introductory Earth Science
Year 2: 12-18 credit hours in Geography. Recommended: **GEOG-2309(3)** Statistical Techniques in Environmental Analysis **and GEOG-2304(3)** Computer Mapping
Prerequisite course(s) for planned Honours courses.
Year 3: 3-6 credit hours at the 4000 level in Geography.
Year 4: 9-12 credit hours at the 4000 level in Geography, including the Thesis.
4000-level courses from other Departments may be credited toward the Geography Honours Major with ADVANCE WRITTEN APPROVAL from the Department Chair.
Students must consult with the Department Chair to determine whether they fulfill the general regulations for the Honours program.
Students must complete the Honours application form before EACH registration in a 4000-level course.
Students planning to complete a Double Honours degree in Geography must consult with the Department Chair for further details.

REQUIREMENTS FOR THE UNIVERSITY OF WINNIPEG / RED RIVER COLLEGE 4-YEAR BA (JOINT PROGRAM IN GEOGRAPHY / GEOGRAPHIC INFORMATION SYSTEMS)

INTRODUCTION

This is a joint program of study whereby students are required to take courses at both The University of Winnipeg and Red River College. The program is intended to integrate a 4-year University of Winnipeg BA in Geography with the 1-year Red River College Advanced Diploma in Geographic Information Systems, effectively compressing five years of study into four years. The program has been specifically designed to prepare students for careers in industry where practical and theoretical skills are necessary.

Students are normally enrolled at The University of Winnipeg in years one, two, and four, and at Red River College for year three. Students who successfully complete the entire program will receive a 4-Year BA Degree from The University of Winnipeg and an Advanced Diploma from Red River College.

Students are required to complete a minimum of 51 credit hours of study at the University of Winnipeg before starting the Diploma program at Red River College. Student may apply during their second year provided the hours requirement will be met before starting at Red River College. It is recommended that students complete 60 credit hours within their first two years to ensure a smooth transition back to the University of Winnipeg.

Please consult the Chair of the Department of Geography for assistance with degree planning. For information concerning the Red River College component of the program contact Roger Hamelin at 632-2983 or rhamelin@rrc.mb.ca.

ADMISSION REQUIREMENT — Students must meet the entrance requirements for admission to The University of Winnipeg. Application to the program in Geography/Geographic Information Systems must be completed through the Admissions Office of The University of Winnipeg by March 1st in order to enter the program in September.

GRADUATION REQUIREMENT — 120 credit hours, that is, 90 credit hours meeting the requirements for the BA General plus 30 additional credit hours.

RESIDENCE REQUIREMENT
Degree: Minimum 60 credit hours

Major:	Minimum 30 credit hours

GENERAL DEGREE REQUIREMENT

Humanities:	12 credit hours in Humanities
Social Science:	12 credit hours
Science:	6 credit hours
Writing:	Minimum 3 credit hours of Academic Writing
Maximum Introductory Courses:	Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level.
Distribution:	Minimum of three (3) credit hours from each of five (5) different subjects
4000-level Courses:	Minimum of six (6) credit hours

MAJOR REQUIREMENT FOR THIS JOINT PROGRAM

Single Major:	Minimum 57 credit hours/Maximum 66 credit hours

UNIVERSITY OF WINNIPEG COURSES

REQUIRED CORE COURSES (30 credit hours):

- **GEOG-1102(3)** Introductory Human Geography I: People, Culture and Environment
- **GEOG-1103(3)** Introductory Human Geography II: Population, Place and Development
- **GEOG-1201(3)** Introductory Atmospheric Science
- **GEOG-1202(3)** Introductory Earth Science
- **GEOG-2304(3)** Computer Mapping
- **GEOG-2306(3)** Introduction to Geographic Information Systems (should be taken before entering RRC Diploma program)
- **GEOG-2309(3)** Statistical Techniques in Environmental Analysis
- **GEOG-2316(3)** Remote Sensing (should be taken before entering RRC Diploma program)
- **GEOG-3306(3)** Advanced Geographic Information Systems or **GEOG-3319(3)** Advanced Remote Sensing (should be taken after RRC Diploma Program)
- **GEOG-3330(3)** Research Methods in Geography

OTHER REQUIREMENTS FOR THE 4-YR BA JOINT UW/RRC PROGRAM IN GEOGRAPHY/GIS (27 credit hours):

GROUP A COURSES: Select nine (9) credit hours from this group:

- **GEOG-2212(3)** Natural Hazards
- **GEOG-2216(3)** Physical Geology
- **GEOG-2213(3)** Introductory Soil Science
- **GEOG-2214(3)** Soil-Vegetation Systems
- **GEOG-3210(3)** Hydrology
- **GEOG-3215(3)** Biogeography

GROUP B COURSES: Select six (6) credit hours from this group:

- **GEOG-2204(3)** Human Impact on the Environment
- **GEOG-2401(3)** Agricultural Geography
- **GEOG-2407(3)** Recreation Geography
- **GEOG-3408(3)** Water Resources
- **GEOG-3508(3)** Geographical Issues in the Developing World

GROUP C COURSES: Select six (6) credit hours from this group:

- **GEOG-3306(3)** Advanced GIS (cannot be used for both the required core and Group C courses)
- **GEOG-3307(3)** Advanced Computer Mapping
- **GEOG-3310(3)** Spatial Analysis
- **GEOG-3319(3)** Advanced Remote Sensing (cannot be used for both the required core and Group C courses)
- **GEOG-4320(3)** Projects in Geomatics
- **GEOG-4321(3)** Topics in Geomatics I or
- **GEOG-4322(3)** Topics in Geomatics II

GROUP D COURSES: Select six (6) credit hours from this group:

- **GEOG-2414(3)** The Urban Environment
- **GEOG-2415(3)** An Introduction to Urban Development
- **GEOG-3402(3)** Urbanization in the Developing World
- **GEOG-4403(3)** Urban Land Use: Developmental Processes
- **GEOG-4404(3)** Field Research in Urban Geography
- **GEOG-4407(3)** Advanced Tourism and Recreation Geography

4-YR BA GEOGRAPHY MAJOR REQUIREMENTS: All students in the 4-Yr BA Joint program are reminded that they must meet the requirements of the general 4-Yr BA in Geography, including 6 credit hours of Regional Geography and an overall minimum of 12 credit hours of upper-level (3000 or 4000) Systematic Human or Geomatics courses with a minimum of 6 credit hours at the 4000 level.

RED RIVER COLLEGE COURSES

TERM 1		**RRC credit hours**
CIVG-4021	Remote Sensing	6
CIVG-4022	Statistics for GIS	3
CIVG-4024	Cartography	4
CIVG-4025	GIS Fundamentals	7
CIVG-4026	Programming 1	6
CIVG-4030	Project Management Fundamental	2
CIVG-4032	Surveying	2
CIVG-4034	GIS Applications 1	3
TERM 2		
CIVG-4027	GIS Modeling	4
CIVG-4028	Applied Remote Sensing	3
CIVG-4029	Programming 2	6
CIVG-4031	Spatial Database Management	5
CIVG-4033	Thesis Project	12
CIVG-4035	GIS Applications 2	3

REQUIREMENTS FOR THE UNIVERSITY OF WINNIPEG / RED RIVER COLLEGE 4-YEAR BSc (JOINT PROGRAM IN GEOGRAPHY / GEOGRAPHIC INFORMATION SYSTEMS)

INTRODUCTION

This is a joint program of study whereby students are required to take courses at both The University of Winnipeg and Red River College. The program is intended to integrate a 4-year University of Winnipeg BSc in Geography with the 1-year Red River College Advanced Diploma in Geographic Information Systems, effectively compressing five years of study into four years. The program has been specifically designed to prepare students for careers in industry where practical and theoretical skills are necessary.

Students are normally enrolled at The University of Winnipeg in years one, two, and four and at Red River College for year three. Students who successfully complete the entire program will receive a 4-Year BSc Degree from The University of Winnipeg and an Advanced Diploma from Red River College.

Students are required to complete a minimum of 51 credit hours of study at the University of Winnipeg before starting the Diploma program at Red River College. Student may apply during their second year provided the hours requirement will be met before starting at Red River College. It is recommended that students complete 60 credit hours within their first two years to ensure a smooth transition back to the University of Winnipeg.

Please consult the Chair of the Department of Geography for assistance with degree planning. For information concerning the Red River College component of the program contact Roger Hamelin at 632-2983 or rhamelin@rrc.mb.ca.

ADMISSION REQUIREMENT

Students must meet the entrance requirements for admission to The University of Winnipeg. Application to the program in Geography/Geographic Information Systems must be completed through the Admissions Office of The University of Winnipeg by March 1st in order to enter the program in September.

GRADUATION REQUIREMENT

120 credit hours, that is, 90 credit hours meeting the requirements for the BSc General plus 30 additional credit hours.

RESIDENCE REQUIREMENT

Degree:	Minimum 60 credit hours
Major:	Minimum 30 credit hours

GENERAL DEGREE REQUIREMENT

Humanities:	12 credit hours in Humanities
Writing:	Minimum 3 credit hours of Academic Writing
Maximum Introductory Courses:	Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level.
Distribution:	Minimum of three (3) credit hours from each of five (5) different subjects
4000-level Courses:	Minimum of six (6) credit hours

MAJOR REQUIREMENT

Single Major:	Minimum 57 credit hours/Maximum 66 credit hours

UNIVERSITY OF WINNIPEG COURSES

REQUIRED CORE COURSES (30 credit hours):

- **GEOG-1102(3)** Introductory Human Geography I: People, Culture and Environment
- **GEOG-1103(3)** Introductory Human Geography II: Population, Place and Development
- **GEOG-1201(3)** Introductory Atmospheric Science
- **GEOG-1202(3)** Introductory Earth Science
- **GEOG-2304(3)** Computer Mapping
- **GEOG-2306(3)** Introduction to Geographic Information Systems (should be taken before entering RRC Diploma Program)
- **GEOG-2309(3)** Statistical Techniques in Environmental Analysis
- **GEOG-2316(3)** Remote Sensing (should be taken before entering RRC Diploma program)
- **GEOG-3306(3)** Advanced Geographic Information Systems or **GEOG-3319(3)** Advanced Remote Sensing (should be taken after RRC Diploma Program)
- **GEOG-3330(3)** Research Methods in Geography

OTHER REQUIREMENTS FOR THE 4-YR BSc JOINT UW/RRC PROGRAM IN GEOGRAPHY/GIS (27 credit hours):

GROUP A COURSES: Select twelve (12) credit hours from this group:

- **GEOG-2207(3)** Climatology
- **GEOG-2210(3)** Meteorology
- **GEOG-2213(3)** Introductory Soil Science
- **GEOG-2214(3)** Soil-Vegetation Systems
- **GEOG-2215(3)** Mineralogy and Petrology
- **GEOG-2216(3)** Physical Geology
- **GEOG-2218(3)** Fluvial and Hillslope Processes
- **GEOG-2219(3)** Glacial & Periglacial Processes

GROUP B COURSES: Select three (3) credit hours from this group:

- **GEOG-2212(3)** Natural Hazards
- **GEOG-3210(3)** Hydrology
- **GEOG-3215(3)** Biogeography

GROUP C COURSES: Select three (3) credit hours from this group:

- **GEOG-4203(3)** Topics in Climatology
- **GEOG-4212(3)** Topics in Earth Science
- **GEOG-4231(3)** Topics in Biogeography
- **GEOG-4232(3)** Conservation

GROUP D COURSES: Select three (3) credit hours from this group:

- **GEOG-3306(3)** Advanced GIS (cannot be used for both the required core and Group D courses)
- **GEOG-3307(3)** Advanced Computer Mapping
- **GEOG-3310(3)** Spatial Analysis
- **GEOG-3319(3)** Advanced Remote Sensing (cannot be used for both the required core and Group D courses)
- **GEOG-4320(3)** Projects in Geomatics
- **GEOG-4321(3)** Topics in Geomatics I or
- **GEOG-4322(3)** Topics in Geomatics II

ADDITIONAL PHYSICAL/GEOMATICS COURSES:	Minimum of six (6) additional credit hours of Physical/Geomatics Geography courses from any Group
NON-GEOGRAPHY SCIENCE REQUIREMENTS	Minimum of 24 credit hours selected from at least two of the Departments of Biology, Applied Computer Science, Chemistry, Mathematics, Physics, and Statistics (for some restrictions, refer to the General Calendar)
4-YR BSc GEOGRAPHY MAJOR REQUIREMENTS:	All students in the 4-Yr BSc Joint program are reminded that they must meet the requirements of the general 4-Yr Bsc in Geography, including an overall minimum of 12 credit hours of upper-level (3000 or 4000) Physical Geography or Geomatics courses with a minimum of 6 credit hours at the 4000 level.

RED RIVER COLLEGE COURSES

TERM 1	**RRC credit hours**
CIVG-4021 Remote Sensing	6

CIVG-4022	Statistics for GIS	3
CIVG-4024	Cartography	4
CIVG-4025	GIS Fundamentals	7
CIVG-4026	Programming 1	6
CIVG-4030	Project Management Fundamental	2
CIVG-4032	Surveying	2
CIVG-4034	GIS Applications 1	3

TERM 2

CIVG-4027	GIS Modeling	4
CIVG-4028	Applied Remote Sensing	3
CIVG-4029	Programming 2	6
CIVG-4031	Spatial Database Management	5
CIVG-4033	Thesis Project	12
CIVG-4035	GIS Applications 2	3

REQUIREMENTS FOR A MINOR IN GEOGRAPHY

Degree: Students must complete a 4-year degree program in order to be eligible to hold the Minor.
Minor: 18 credit hours in the Minor subject, with a minimum of 12 credit hours above the 1000-level
Residence Requirement: Minimum 12 credit hours in the Minor subject

Required courses for Human Geography Minor:

GEOG-1102 Introductory Human Geography I: People, Culture and Environment (3 credit hours)
GEOG-1102 Introductory Human Geography II: Population, Place and Development (3 credit hours)
GEOG-2304 Computer Mapping (3 credit hours)

Elective:

Any six (6) credit hours at the 2000 level in Human Geography, Regional, or Geomatics
Any three (3) credit hours at the 3000 level or higher in Human Geography, Regional or Geomatics

Required courses for Physical Geography Minor:

GEOG-1202 Introductory Atmospheric Science (3 credit hours)
GEOG-1203 Introductory Earth Science (3 credit hours)
GEOG-2304 Computer Mapping (3 credit hours)

Elective

Any six (6) credit hours at the 2000 level in Physical Geography or Geomatics
Any three (3) credit hours at the 3000 level or higher in Physical Geography or Geomatics

GENERAL INFORMATION

Geography Courses Which Satisfy the Science Requirement
The Science requirement will be satisfied by 6 credit hours from the following courses:

GEOG-1201(3)	Introductory Atmospheric Science
GEOG-1202(3)	Introductory Earth Science
GEOG-2201(6)	Geomorphology
GEOG-2207(3)	Climatology
GEOG-2210(3)	Meteorology
GEOG-2213(3)	Introductory Soil Science
GEOG-2214(3)	Soil-Vegetation Systems
GEOG-2215(3)	Mineralogy and Petrology
GEOG-2216(3)	Physical Geology
GEOG-2218(3)	Fluvial and Hillslope Processes
GEOG-2219(3)	Glacial and Periglacial Processes
GEOG-3210(3)	Hydrology
GEOG-2304(3)	Computer Mapping
GEOG-2306(3	Introduction to Geographic Information System
GEOG-2316(3)	Introduction to Remote Sensing
GEOG-3215(3)	Biogeography
GEOG-3306(3)	Advanced Geographic Information System
GEOG-3307(3)	Advanced Computer Mapping
GEOG-3319(3)	Advanced Remote Sensing
GEOG-4203(3)	Topics in Climatology
GEOG-4212(3)	Topics in Earth Sciences
GEOG-4231(3)	Topics in Biogeography
GEOG-4320(3)	Projects in Geomatics
GEOG-4321(3)	Topics in Geomatics I1
GEOG-4322(3)	Topics in Geomatics II1

Geography Courses Which Satisfy the Social Science Requirement
The Social Science requirement will be satisfied by 12 credit hours from courses in Systematic Human and/or Regional Geography (i.e. courses for which the second digit of the course number is a 4 or 5).

4000-Level Courses: Minimum 3.0 GPA (B) in major courses (students lacking the requisite 3.0 GPA should consult the department concerned regarding eligibility to take 4000-level courses). Permission of the department is required for each 4000-level course.

COURSE LISTINGS

Geography courses are categorized into five major groups: General, Physical, Geomatics, Human, and Regional. Courses are distinguished by the use of the second digit in the course number as follows:

General	Second digit is 1 (e.g. 1102(3) Introductory Human Geography I: People, Culture and Environment)
Physical	Second digit is 2 (e.g. 1201(3) Introductory Atmospheric Science)
Geomatics	Second digit is 3 (e.g. 2309(3) Statistical Techniques in Environmental Analysis)
Human	Second digit is 4 (e.g. 2407(3) Recreation Geography)
Regional	Second digit is 5 (e.g. 2503(3) Manitoba's Physical and Human Environments)

Beyond the minimum requirements for each degree, students may choose courses which provide a coherent specialization within the discipline. Guidelines to assist in this selection are included in the Departmental brochure, which is published annually and available from the Department secretary in 5L02.

INTRODUCTORY AND GENERAL COURSES

GEOG-1102(3) Introductory Human Geography I: People, Culture and Environment
GEOG-1103(3) Introductory Human Geography II: Population, Place and Development
GEOG-1201(3) Introductory Atmospheric Science
GEOG-1202(3) Introductory Earth Science

PHYSICAL GEOGRAPHY COURSES

GEOG-2204(3) Human Impact on the Environment
GEOG-2207(3) Climatology
GEOG-2210(3) Meteorology
GEOG-2212(3) Natural Hazards
GEOG-2213(3) Introductory Soil Science
GEOG-2214(3) Soil-Vegetation Systems
GEOG-2215(3) Mineralogy and Petrology
GEOG-2216(3) Physical Geology
GEOG-2218(3) Fluvial and Hillslope Processes
GEOG-2219(3) Glacial and Periglacial Processes
GEOG-3204(3) Climate Change and Variability
GEOG-3210(3) Hydrology
GEOG-3211(3) Karst and Coastal Geomorphology
GEOG-3213(3) Sedimentology
GEOG-3215(3) Biogeography
GEOG-3216(3) Arctic Environments
GEOG-3217(3) Tropical Environments
GEOG-3219(3) Quaternary Environments
GEOG-4203(3) Topics in Climatology
GEOG-4212(3) Topics in Earth Sciences
GEOG-4231(3) Topics in Biogeography
GEOG-4702(3) Directed Readings in Physical Geography
GEOG-4801(3) Physical Geography Field Seminar
GEOG-4901(6) Honours Geography Thesis

GEOMATICS COURSES

GEOG-2304(3) Computer Mapping
GEOG-2306(3) Introduction to Geographic Information Systems
GEOG-2309(3) Statistical Techniques in Environmental Analysis
GEOG-2316(3) Remote Sensing
GEOG-3306(3) Advanced Geographic Information Systems
GEOG-3307(3) Advanced Computer Mapping
GEOG-3319(3) Advanced Remote Sensing
GEOG-3330(3) Research Methods in Geography
GEOG-4320(3) Projects in Geomatics
GEOG-4321(3) Topics in Geomatics I
GEOG-4322(3) Topics in Geomatic II
GEOG-4703(3) Directed Readings in Geomatics

SYSTEMATIC HUMAN GEOGRAPHY COURSES

GEOG-2401(3) Agricultural Geography
GEOG-2407(3) Recreation Geography
GEOG-2408(3) Environmental Perception and Human Behaviour
GEOG-2409(6) Energy, Resources and Economic Development
GEOG-2410(3) Selling Places: Geography of Marketing Tourism
GEOG-2411(3) Geography of Globalization
GEOG-2412(3) A Geographical Perspective on Tourism
GEOG-2414(3) The Urban Environment
GEOG-2415(3) An Introduction to Urban Development
GEOG-2416(3) Sex, Gender, Space and Place
GEOG-2417(3) An Introduction to Economic Geography
GEOG-3401(3) Population Geography
GEOG-3402(3) Urbanization in the Developing World
GEOG-3408(3) Water Resources
GEOG-3411(3) Heritage Conservation and Tourism
GEOG-3413(3) Urban Revitalization: Rebuilding of Decaying Cities
GEOG-3432(3) Urban and Community Planning
GEOG-3415(3) Contested Space: A Geography of Place
GEOG-3430(3) Housing and the Neighbourhood
GEOG-3432(3) Urban and Community Planning
GEOG-4403(3) Urban Land Use: Developmental Processes
GEOG-4404(3) Field Research in Urban Geography
GEOG-4407(3) Advanced Tourism and Recreation Geography
GEOG-4409(3) Architecture and City Planning
GEOG-4441(3) Advanced Studies in Environmental Perception
GEOG-4450(3) Environment and Sustainability I
GEOG-4701(3) Directed Readings in Human Geography
GEOG-4901(6) Honours Geography Thesis

EXPERIMENTAL COURSES

GEOG-2418(3) Health Geography
GEOG-2419(3) Resource Development and the Canadian Environment
GEOG-4215(3) Topics in Earth Science II
GEOG-4415(3) Power, Knowledge, Geography

REGIONAL GEOGRAPHY COURSES

Students are reminded that Geography 1102(3) and 1103(3), 1201(3), and 1202(3) provide appropriate background for all regional courses. Students lacking first year geography and wishing to take a regional course should consult the Instructor concerned.

GEOG-2503(3) Manitoba's Physical and Human Environments
GEOG-3508(3) Geographical Issues in the Developing World
GEOG-3509(3) Canada's Physical and Human Environments
GEOG-3510(3) Prairie Landscapes
GEOG-3511(3) Topical Regions in Geography
GEOG-3512(3) The Human Geography of Northern Canada

COURSE DESCRIPTIONS

GEOG-1102(3) INTRODUCTORY HUMAN GEOGRAPHY I: PEOPLE, CULTURE AND ENVIRONMENT (Le3) Attitudes to the world are determined to a great extent by culture. The ways in which people behave, socially and geographically, are determined by systems of belief and cultural understandings. The focus of this introductory course is the role of culture in determining geographical patterns and landscapes. It will consider language, religion, rural and urban settlement, global and gender inequities, the expression of power in the landscape and the changing global political landscape. Emphasis will be placed on current developments in the tension areas of the world.
RESTRICTIONS: Students may not receive credit for both GEOG-1102(3) and the former GEOG-1101(6).

GEOG-1103(3) INTRODUCTORY HUMAN GEOGRAPHY II: POPULATION, PLACE AND DEVELOPMENT (Le3) **The** growth of the human population, how this population earns its livelihood, and the various forms of settlement are placing serious strains on our environment. The ability to cope with these issues will determine the quality of life the world's population will experience in the future. The focus of this introductory course in population change and migration, various forms of economic activity, urbanization, levels of development and the implications of changes in these theme areas will be emphasized for the environment. Current developments in these areas will be emphasized and case studies from many areas of the world will highlight important concepts and issues. The course will illustrate how geographical concepts and tools can be used to analyse and inform these issues.
RESTRICTIONS: Students may not receive credit for both GEOG-1103(3) and the former GEOG-1101(6).

GEOG-1201(3) INTRODUCTORY ATMOSPHERIC SCIENCE (Le3, La2) This course is an introduction to the atmospheric sciences of climatology and meteorology. The introduction to climatology examines how and why average atmospheric conditions (i.e., climates) vary from place to place and over time (e.g., over months, years, centuries). The introduction to meteorology surveys the nature of the atmosphere and the causes and characteristics of short-term atmospheric conditions (i.e., weather). Methods of collecting and analyzing climate and weather data are reviewed, as are the ways in which atmospheric processes interact with other components of the ecosphere (i.e., the biosphere, lithosphere, hydrosphere, humans).
RESTRICTIONS: Students may not receive credit for both GEOG-1201(3) and the former GEOG-1200(6).
Note: This course can be used towards the Science Requirement.

GEOG-1202(3) INTRODUCTORY EARTH SCIENCE (Le3, La2) This course introduces students to geomorphology, the study of landforms and landscapes on the surface of the Earth. Processes of geologic (mountain building, volcanism, etc.) and geomorphic change (weathering, erosion, and deposition by water, ice, and wind) will be surveyed.
RESTRICTIONS: Students may not receive credit for both GEOG-1202(3) and the former GEOG-1200(6).
Note: This course can be used towards the Science Requirement.

GEOG-2204(3) HUMAN IMPACT ON THE ENVIRONMENT (Le3) This course studies the causes, effects, and controls of detrimental change to the natural environment resulting from human activity. Emphasis will be given to issues pertaining to the alteration of ecosystems and the various types of air, water, and soil pollution.

GEOG-2207(3) CLIMATOLOGY (Le3, La2) This course examines climatological processes, at all scales (e.g., micro to macro), to arrive at an understanding of how and why climates vary spatially and temporally. It surveys the characteristics of the global climate system, but pays particular attention to the Northern Hemisphere and North America. Laboratory exercises involve the analysis and presentation of climatological data.
PREREQUISITE: GEOG-1201(3).

GEOG-2210(3) METEOROLOGY (Le3, La2) This course surveys the causes and characteristics of weather. Fundamental thermodynamic and hydrodynamic principles of atmospheric physics will be reviewed. Common and severe/unusual weather phenomena will be explained, as will be the processes involved in the preparation of weather forecasts.
PREREQUISITES: GEOG-1201(3) or permission of instructor.

GEOG-2212(3) NATURAL HAZARDS (Le3) This course examines the causes and characteristics of natural hazards. Emphasis is placed on the assessment of risk, the choice of adjustments, and differences between situations in developed and developing countries. Discussions will cover hurricanes, tornadoes, floods, earthquakes, and blizzards, as time permits.
PREREQUISITES: GEOG-1201(3) or GEOG-1202(3) or permission of instructor.

GEOG-2213(3) INTRODUCTORY SOIL SCIENCE (Le3, La2) This course provides an introduction to pedology, the study of soils as physical entities in their own right. A review of the history of soil science is followed by a detailed introduction to soil forming factors and soil genesis. A brief review of the US Soil Taxonomy classification system then introduces a detailed review of the Canadian Soil Classification System, and the geographic distribution of soil types. This is followed by a review of the physical and chemical properties of soils, soil organisms and soil organic matter. The course concludes with an introduction to edaphology, the study of soils from the point of view of their plant cover. Laboratory sessions deal with the physical and chemical properties of soils using soil samples collected on one or more field trips, and with soil classification.
PREREQUISITES: GEOG-1201(3) and GEOG-1202(3) or permission of the instructor.
RESTRICTIONS: Students may not receive credit for both GEOG-2213(3) and the former GEOG-2203(6).

GEOG-2214(3) SOIL-VEGETATION SYSTEMS (Le3, La2) A review of edaphology, the study of soils from the point of view of their plant cover, is followed by an examination of soils as nutrient delivery systems to both natural cover and agroecosystems. Emphasis is placed on macro- and

micronutrient supply, the use of fertilizers and organic residues, the role of organic farming, and water supply, drainage and erosion. This is followed by a discussion of the basic ecological/physiological requirements of plants important in understanding vegetation formations and ecoclimatic regions. The course concludes with a major discussion of Canada's ecoclimatic regions and the relationships between their vegetation covers, soil types and climates. Laboratory work includes the determination of certain soil nutrient contents, and the role of soil organic matter, plant residues and plant cover in limiting erosion, and the ecoclimatic aspects of vegetation formation distribution.
PREREQUISITES: GEOG-2213(3).
RESTRICTIONS: Students may not receive credit for both GEOG-2214(3) and the former GEOG-2203(6).

GEOG-2215(3) MINERALOGY AND PETROLOGY (Le3, La2) Students are introduced to the chemical and physical properties of the common minerals and rocks. Emphasis is placed on the origin, composition and classification of the common minerals and rock types. Weekly laboratories provide the student with the skills necessary for routine identification of minerals and rocks in hand samples. Students are also introduced to the fundamentals of optical mineralogy, which include the practice of study and identification of minerals using the polarizing microscope and rock thin sections. An optional field trip highlighting local geological features serves as an introduction to field recognition and classification of minerals and rocks and their associated provenance.
PREREQUISITES: GEOG-1202(3) or permission of instructor.
RESTRICTIONS: Students with standing in the former GEOG-2202(6) may not receive credit for GEOG-2215(3).

GEOG-2216(3) PHYSICAL GEOLOGY (**Le3, La2)** This course surveys the elements of stratigraphy, structural geology, earthquakes, historical geology, and volcanism within the unifying concept of plate tectonics. Labs demonstrate the methods of determining the characteristics of major geological structures as they typically appear on maps and air photos.
PREREQUISITE: GEOG-2215(3).
RESTRICTIONS: Students with standing in the former GEOG-2202(6) may not receive credit for GEOG-2216(3).

GEOG-2218(3) FLUVIAL AND HILLSLOPE PROCESSES (Le3, La2) This course examines geomorphic processes operating in rivers and on slopes. Among the topics discussed are the factors which influence the stability and form of slopes, the characteristics of watersheds and stream networks, the factors which govern the forms, patterns adjustments and long profiles of river channels, the transport of sediment in fluvial systems, the depositional features produced by streams, and the long-term evolution of entire landscapes. Labs emphasize both analytic methods and the interpretation of maps and air photos.
PRE-REQUISITE: GEOG-1202(3).
RESTRICTIONS: Students with standing in the former GEOG-2201(6) may not receive credit for GEOG-2218(3).

GEOG-2219(3) GLACIAL AND PERIGLACIAL PROCESSES (Le3, La2) This course examines the geomorphic processes operating in glacial and periglacial environments. Topics discussed include the basic concepts of physical glaciology, glacial erosion and sedimentation, Quaternary geology and Pleistocene chronology, the methods used to interpret and reconstruct glacial and interglacial successions, the causes of global glaciation, periglacial processes and landforms, and the geomorphic significance of sea ice. Analytical and data acquisition techniques are emphasized in the labs.
PREREQUISITES: GEOG-1202(3) or permission of instructor.
RESTRICTIONS: Students with standing in the former GEOG-2201(6) or the former GEOG-2211(3) may not receive credit for GEOG-2219(3).

GEOG-2304(3) COMPUTER MAPPING (Le3, La2) This course provides an introduction to the theory, practice, and methods of computer mapping. Students make use of existing cartographic and statistical data bases, as well as input information through digitizing and scanning, to construct thematic maps using various microcomputer software packages.
PREREQUISITES: GEOG-1102(3) or GEOG-1103(3) or GEOG-1201(3) or GEOG-1202(3) or permission of instructor.

GEOG-2306(3) INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS (Le3, La2) This course provides a systematic overview of GIS methodology and theory covering the essential principles of data acquisition, input, manipulation, and output. The laboratory component of this course provides hands-on experience using industry standard software.
PREREQUISITES: GEOG-2304(3) or permission of instructor.
RESTRICTIONS: Students with standing in the former GEOG-3302(6) may not receive credit for GEOG-2306(3).

GEOG-2309(3) STATISTICAL TECHNIQUES IN ENVIRONMENTAL ANALYSIS (Le3, La1) Statistics describe and summarize data, and make predictions about a population from the information contained in samples. This course provides a working understanding of the elementary statistical techniques and computational procedures for students with little background in mathematics, and focuses on the applications of these tools to the analyses of geographical and environmental data. Topics include scales of measurement, univariate descriptive statistics, time series analysis, probability, sampling design, hypothesis testing, regression and correlation analysis, and models as quantitative techniques.
PREREQUISITES: GEOG-1102(3) or GEOG-1103(3) or the former GEOG-1101(6) or GEOG-1201(3) or GEOG-1202(3) or permission of instructor.
RESTRICTIONS: Students with standing in the former GEOG-2310(3) may not receive credit for GEOG-2309(3).

GEOG-2316(3) INTRODUCTION TO REMOTE SENSING (Le3, La2) This course introduces the principles of remote sensing and image analysis with a focus on the physics, sensor technology, processing, interpretation and applications of remotely sensed imagery with a specific emphasis on optical sensors and technologies.
PREREQUISITES: GEOG-2304(3) or permission of instructor
RESTRICTIONS: Students may not receive credit for both GEOG-2316(3) and the former GEOG-3304(3).

GEOG-2401(3) AGRICULTURAL GEOGRAPHY (Le3)
A study of agriculture from the viewpoint of physical and cultural environments, systems of exploitation, regional analysis, and a survey of the world's major agricultural activities.

GEOG-2407(3) RECREATION GEOGRAPHY (Le3)
Expanded leisure time has led to increased demands on recreational space from the level of the city park and playground to the use and abuse of wilderness areas. This course discusses the concept of competing and multifacial recreational space use. Emphasis is put upon topical questions.
PREREQUISITES: GEOG-1102(3) or GEOG-1103(3) or permission of instructor.

GEOG-2408(3) ENVIRONMENTAL PERCEPTION AND HUMAN BEHAVIOUR (Le3) This course will focus on varied

themes and topics relating to perceptions of physical and social environments. Variations in the perception, images, and attitudes held by individuals and groups within different societies will be examined and related to varied behavioral responses within a spatial and environmental context. Topics of interest in this course are (1) perception of natural hazards (floods, droughts, frosts, hail, etc.); (2) perception of natural resources and the management of natural resources; (3) images of urban neighbourhoods, cities, metropolitan regions, provinces, countries, the world; (4) mental maps; (5) attitudes towards resource development and the implications for local, regional, and national planning.
PREREQUISITES: GEOG-1102(3) or permission of instructor.

GEOG-2411(3) GEOGRAPHY OF GLOBALIZATION (Le3) This course engages the topic of globalization from a specifically geographical perspective. In today's world, a small minority of people lead relatively affluent lives. For the majority, however, life is a constant struggle for survival. At the same time, the statement that we live in one world has probably never been truer. The struggle of the many is related very strongly to the comfort of the few. This course will examine the impact of globalization on different types of economies and the political, social, cultural, and environmental change that people experience in an interconnected "one world".
PREREQUISITES: GEOG-1103(3) or permission of instructor.

GEOG-2412(3) A GEOGRAPHICAL PERSPECTIVE ON TOURISM (Le3) Tourism is the world's most rapidly growing industry. It is now essential to the Canadian economy, and is the mainstay of many other national economies. This course provides a broad overview of the world tourism industry that includes a geo-historical perspective on the origins, evolution, and growth of tourism, the structure of the tourism industry, tourism market segments, destinations and demands, and the impacts of tourism on both tourists themselves and their host communities. Concepts of capacity and sustainable tourism are addressed. Some attention is given to local, regional, and Canadian development strategies and special topics in tourism.
PREREQUISITES: GEOG-1102(3) or GEOG-1103(3) or permission of instructor.

GEOG-2414(3) THE URBAN ENVIRONMENT (Le3) Cities are artificial environments. They absorb vast quantities of resources from surrounding areas and create great volumes of waste. They can also have a tremendous effect on their surrounding hinterland. Their "ecological footprint" is significant. This course examines the structure and activities of cities and the resulting effects on the environment. Approaches to developing more sustainable and environmentally sensitive cities are discussed.
PREREQUISITES: GEOG-1103(3) or GEOG-2415(3) or permission of instructor.

GEOG-2415(3) AN INTRODUCTION TO URBAN DEVELOPMENT (Le3) This course will examine the origins and evolution of cities, urban design, morphologic and townscape elements, and the economy and structure of urban systems.

GEOG-2416(3) SEX, GENDER, SPACE & PLACE (Le3) This course examines, from interdisciplinary perspectives, relationships among sex, gender, space and place in social-ecological systems. It specifically examines how sex, gender, race, ethnicity, class, sexuality, and other aspects of identity affect the transformation of space into place in social-ecological systems. Drawing on perspectives from environmental studies, geography and women's studies, selected relevant topics considered may include environmental justice, ecofeminism, the cultural politics and political geography of sex and sexual identities, the gendering and sexing of city landscapes, architecture and natural areas, notions of public and private space, and the space/place in the socio-cultural construction of femininities and masculinities.
PREREQUISITES: GEOG-1102(3) AND GEOG-1103(3), or ENV-1600(3), WGS-1232(6) or permission of instructor.

GEOG-2417(3) AN INTRODUCTION TO ECONOMIC GEOGRAPHY (Le3) This course is designed to introduce the student to the basic principles of economic geography. The course is divided into two main topic areas. The first is an introduction to location theory, and the second introduces regional economic development. In essence, location theory attempts to determine why economic activities are located where they are or why they should be located in one place as opposed to another. It looks at all types of economic activity, including agriculture, manufacturing, and retail. The second topic, examining economic development and trade, seeks to explain why some regions prosper while others do not. It also examines strategies that will enable a region to enhance its economic development potential and explains patterns of trade.
PREREQUISITES: GEOG-1103(3) or permission of instructor.
RESTRICTIONS: Students with standing in GEOG-2409(6) may not receive credit for GEOG-2417(3).

GEOG-2503(3) MANITOBA'S PHYSICAL AND HUMAN ENVIRONMENTS (Le3) The main physical features of Manitoba are examined first. The second part of the course deals with rural settlement, beginning with the Red River Settlement and proceeding to the main homesteading period from 1870 to 1930. In the third part of the course, emphasis is given to economic development in Northern Manitoba, flood control works in the Red River Valley, and aspects of Winnipeg's growth, relative decline, and ethnic mix.
PREREQUISITES: A minimum of 3 credit hours of 1000-level Geography courses or permission of the instructor.
RESTRICTIONS: Students with standing in the former GEOG-2500(6) may not receive credit for GEOG-2503(3).

GEOG-3204(3) CLIMATE CHANGE AND VARIABILITY (Le3) The causes and characteristics of regional and global climate change and variability will be examined, as will be the methods of reconstructing climate histories. Emphasis will be placed on the North American experience. Topics will include atmosphere teleconnections (e.g., El Niño and La Niña), global warming, and climate forecasting.
PREREQUISITES: GEOG-2207(3) or permission of the instructor.

GEOG-3210(3) HYDROLOGY (Le3) This course examines all major components (precipitation, evaporation, streamflow, groundwater) of the hydrologic cycle with the most attention being given to surface hydrology. The emphasis throughout the course will be placed upon the methods by which each component may be measured or estimated. Additional topics to be covered include the causes and consequences of floods, flood frequency analysis, estimation of peak streamflows, snow hydrology, sediment transport, water balance methods, and urban hydrology. Weekly assignments will provide experience in the practical aspects of data treatment, measurement techniques, and methods of prediction. This course will be offered in alternate years.
PREREQUISITES: GEOG-1201(3) and GEOG-1202(3), or permission of instructor.
RESTRICTIONS: Students may not receive credit for both GEOG-3210(3) and the former GEOG-4221(3).

GEOG-3215(3) BIOGEOGRAPHY (Le3, La2) This course first addresses the history of biogeography and the contemporary views on both species diversity and biodiversity. This is followed by an examination of the role of plate tectonics in helping account for contemporary floral and

faunal realms, a review of MacArthur and Wilson's "equilibrium theory of island biogeography", and a consideration of how species colonize isolated locations such as islands. Anthropogenic alterations of natural ecosystems are then reviewed in terms of nutrient cycling disruptions, and the course concludes with an examination of both natural and human induced vegetation cover changes during the Holocene Epoch. Laboratory sessions deal primarily with aspects of island biogeography, nutrient cycle modifications, and techniques used in reconstructing past vegetation covers.
PREREQUISITES OR CONCURRENT: the former GEOG-2203(6), or GEOG-2213(3) and GEOG-2214(3), or permission of instructor.

GEOG-3216(3) ARCTIC ENVIRONMENTS (Le3) The Arctic comprises about one-third of Canada but most 'southern' Canadians have little more than a passing knowledge of its character. This course is designed to improve our understanding of the physical environment, ecology, history, people, economy, and political development of a region which becomes less remote from the affairs of the nation each year.
PREREQUISITES: GEOG-1201(3) and GEOG-1202(3), or permission of instructor.

GEOG-3217(3) TROPICAL ENVIRONMENTS (Le3) This course will deal primarily with the physical geography, soil vegetation systems, and induced environmental problems found in the wet and dry tropics and subtropics. Specific topics will include the influence of tectonics on landscape, variations in climate, soil fertility, soil-vegetation interrelationships, and the consequences of over-exploitation of both physical and biological resources.
PREREQUISITES: GEOG-1201(3) and GEOG-1202(3).

GEOG-3219(3) QUATERNARY ENVIRONMENTS (Le3) The Quaternary is a period of dramatic climatic changes. This course examines the consequences of Quaternary climatic fluctuations on the physical environment. Consideration will be given to some of the important evidence and techniques used to reconstruct Quaternary environments and chronology.
PREREQUISITES: Any second year physical geography course, or permission of instructor.

GEOG-3306(3) ADVANCED GEOGRAPHIC INFORMATION SYSTEMS (Le3, La2) This course deals with advanced theory and applications within GIS including 3D modeling, spatial analysis, and data creation, management and fusion with other data sources and types. Laboratory instruction provides the students with enhanced skills through exposure to the higher-level functions of industry standard GIS software.
PREREQUISITES: GEOG-2306(3) or GEOG-3302(3), or permission of instructor.
RESTRICTIONS: Students may not receive credit for both GEOG-3306(3) and GEOG-4308(3)

GEOG-3307(3) ADVANCED COMPUTER MAPPING (Le3, La2) Topics introduced in GEOG-2304(3) (Computer Mapping) are expanded upon, and new topics are presented, through a series of seminars on selected areas of current cartographic research. Government agencies and businesses involved in map production are visited in order to examine methods and technology used in spatial data collection, handling and transfer. Lab work includes creating interactive hyper-linked maps and animated maps, showing spatial change over time. A significant component of this course is the completion of a substantial mapping project.
PREREQUISITES: GEOG-2304(3), or permission of instructor.
RESTRICTIONS: Students may not receive credit for both GEOG-3307(3) and GEOG-4307(3)

GEOG-3319(3) ADVANCED REMOTE SENSING (Le3, La2) This course provides instruction on advanced image processing and classification techniques. These techniques are applied to the study of physical and human environments through a series of laboratory exercises and assignments. Students also gain exposure to RADAR and hyperspectral remote sensing including exposure to handheld imaging devices.
PREREQUISITES: GEOG-2316(3), or permission of instructor.
RESTRICTIONS: Students may not receive credit for both GEOG-3319(3) and GEOG-4314(3)

GEOG-3330(3) RESEARCH METHODS IN GEOGRAPHY (Le3) This course introduces students to skills for conducting geographic research, and explores the uses, limitations, and methods associated with quantitative and qualitative analysis in human and physical geography. These skills are relevant for careers in academic and professional fields. Topics include primary data collection and analyses, questionnaire design and structured interviews, data assembly and interpretation, research design and ethics, and the presentation of research results. This course includes a significant practical element.
PREREQUISITES: GEOG-1102(3), GEOG-1103(3), GEOG-1201(3), GEOG-1202(3), and GEOG-2309(3) or permission of instructor.

GEOG-3401(3) POPULATION GEOGRAPHY (Le3) This course examines the history of the growth of the world's population and the present-day crises inherent in both the numbers and distribution of the global totals. Special attention is paid to the problems of defining such terms as "over-population", and to the lack of correlation between population, resources, and technology.
PREREQUISITES: GEOG-1103(3) or permission of instructor.

GEOG-3402(3) URBANIZATION IN THE DEVELOPING WORLD (Le3) The process of urbanization is now a developing, as opposed to a developed, world phenomenon. This course will explore the factors promoting urbanization in the developing world and discuss models of third world cities. The emphasis will be on problems facing the cities and the solutions that have been attempted. Specific topics will include urban growth and management, urban services, squatter settlements, the housing market, survival tactics of the urban poor, urban government, and the function of the city in the developing world.
PREREQUISITES: GEOG-1103(3) or GEOG-2415(3) permission of instructor.

GEOG-3408(3) WATER RESOURCES (Le3) The following are just some of the topics developed: the Columbia River Treaty, the Churchill Diversion, is Canada's water for sale? In predicting future Canadian needs for water, the relative merits of direct and indirect methods of forecasting are assessed. Analytical techniques such as economic base, input-output, and cost-benefit are fully developed.
PREREQUISITES: GEOG-1102(3) or permission of instructor.

GEOG-3411(3) HERITAGE CONSERVATION AND TOURISM (Le3) Tourism is the world's largest growth industry, with cultural tourism being its most rapidly growing sector. Cultural tourism is highly dependent on the development, interpretation, and marketing of a region's heritage resources (i.e., its folk arts, historic sites, architecture and rural land urban landscapes). This course examines the nature of heritage resources and reviews the processes of their identification and the strategies for their development. Preservation, interpretation and management techniques and their relationship to the needs of the tourist industry will be discussed. The emphasis of the course will be on the problems of heritage resource development in

North America, particularly in western Canada.
PREREQUISITES: GEOG-1102(3) and GEOG-1103(3) or the former GEOG-1101(6), or the former GEOG-2500(6) or the former GEOG-2403(3), or permission of instructor.

GEOG-3413(3) URBAN REVITALIZATION: REBUILDING OF DECAYING CITIES (Le3) Issues surrounding growth and development have been replaced by concerns about decline and revitalization in many North American and European cities. This course will focus on urban decline and revitalization efforts. Theories of decline and the demographic, economic, and physical changes that occur in declining city neighbourhoods will be discussed. The course will then explore revitalization efforts, drawing extensively on case study material from selected cities as well as field and project work within Winnipeg. Broad approaches to revitalization, revitalizing the commercial sector, attracting people back to the inner city, leadership and the role of partnerships, rejuvenating older, greying suburban neighbourhoods, and planning for long term sustainability will be among the topics discussed.
PREREQUISITES: GEOG-2415(3) or permission of instructor.

GEOG-3415(3) CONTESTED SPACE: A GEOGRAPHY OF PLACE (Le3) The 'new cultural geography' stresses the relationship between space and culture, examining culture as it is constituted through space and as place. The course explores the struggles that make cultures and how they are worked out in particular spaces and places (i.e. landscapes). It also discusses spatial aspects of ideologies of race, the role of language and discourse in defining cultural spaces, the development and maintenance of subcultures, immigration as sources of tensions in the contemporary world, issues of gender, and the ways in which landscapes and places carry the physical and symbolic imprints of cultural wars.
PREREQUISITES: GEOG-1102(3) or GEOG-1103(3) or permission of the instructor.

GEOG-3430(3) HOUSING AND THE NEIGHBOURHOOD (Le3) This course examines the complexity of shelter environments within the urban landscape. The focus is on the North American housing market, the history of housing, and the way in which traditional and non-traditional markets are defined and understood. The unique characteristics of the modern city are examined as they are manifested in homelessness, marginal housing forms, shelter-induced poverty, suburban decline, and inner-city issues. Emphasis is also placed on current/historical policy and program responses to housing-related issues at the neighbourhood, municipal, provincial, and federal level.
PREREQUISITES: UIC-1001(3) or GEOG-1102(3)

GEOG-3432(3) URBAN AND COMMUNITY PLANNING (Le2,S1) Urban planning is a process that has importance for the quality of life of those who live in inner-city and downtown neighbourhoods. According to Friedmann, planning is an interdisciplinary field that "links knowledge to action". This course examines traditions, theories and values in planning practice and highlights the important role in planning of civil society and community. Broad approaches to planning in Canada, the USA, and Britain, and specific processes and policies in Winnipeg, provide students with background on planning systems. The emphasis in this course is on practical knowledge and skills for community organizers.
PREREQUISITES: UIC-1001(6) or the former UIC-1001(3) or UIC-2001(3) or GEOG-1103(3).

GEOG-3508(3) GEOGRAPHICAL ISSUES IN THE DEVELOPING WORLD (Le3) Focusing on Asian, African, and Latin American countries, this course concentrates on development theories and issues. The course content includes discussion of the historical, political, socio-economic, cultural, and demographic factors important to the development equation and illustrates how these factors vary from region to region. Special attention is paid to newsworthy and unfolding issues of the day in the developing areas of the world.
PREREQUISITES: GEOG-1102(3) or GEOG-1103(3) or permission of the instructor.

GEOG-3509(3) CANADA'S PHYSICAL AND HUMAN ENVIRONMENTS (Le3) Canada's main regions are examined, with an emphasis on how the physical and human environments of each region have interacted to give it a unique character.
PREREQUISITES: A minimum of 3 credit hours of 1000-level Geography courses or permission of the instructor.
RESTRICTIONS: Students with standing in the former GEOG-3501(6) may not receive credit for GEOG-3509(3).

GEOG-3510(3) PRAIRIE LANDSCAPES (Le3) The Canadian Prairies are recognized as a main geographical region of Canada. This course focuses on the making of the human landscape of the region, although geological structure, climate, natural vegetation, and other physical features are included. The roles of Aboriginal Peoples and European and other immigrants in creating human landscapes are examined.

GEOG-3511(3) TOPICAL REGIONS IN GEOGRAPHY (Le3) This course is a systematic study of a topical world region from a geographic perspective. For the particular region selected for study, emphasis is placed on historical, political, socio-economic, cultural, demographic, and urban-rural development aspects as appropriate. The region of study will vary from year to year, with particular attention paid to regions currently or recently dominating world events.
PREREQUISITES: GEOG-1102(3) or GEOG-1103(3) or permission of the instructor.

GEOG-3512(3) THE HUMAN GEOGRAPHY OF NORTHERN CANADA (Le3) This course investigates contemporary issues in Canada's arctic and subarctic regions, focusing on the three territories: Yukon, Northwest Territories, and Nunavut. This region continues to be subjected to a variety of changes in the political, social and economic landscapes. The purpose of this course is to provide students insight into how these changes impact the human geography of northern Canada. Special attention is paid to ongoing and newsworthy issues.
PREREQUISITES: GEOG-1102(3) or permission of instructor.

GEOG-4203(3) TOPICS IN CLIMATOLOGY (S3) This seminar course requires students to complete climate-related research projects, either individually or as a group. Research topics will vary to suit the interests of both the Instructor and the students.
PREREQUISITES: the former GEOG-2205(6) or the former GEOG-2206(3), or GEOG-2207(3), or permission of instructor.

GEOG-4212(3) TOPICS IN EARTH SCIENCES (S3) The course examines current and historically significant concepts in fluvial and glacial geomorphology, geology, and related earth sciences, particularly those which produced lasting shifts in the way earth science phenomena are interpreted. Among the broad subject areas which are discussed are concepts in landscape evolution, the characteristics, patterns and metamorphosis of river channels, glacial spillways on the Prairies, catastrophic drainage of ice sheets, patterns of glacial erosion, geomorphic thresholds, plate tectonics theory, and asteroid

impact and the Geologic Time Scale.
PRE-REQUISITES: 6 credit hours from GEOG-2215(3), GEOG-2216(3), GEOG-2218(3), GEOG-2219(3), or the former GEOG-2201(6) or the former GEOG-2202(6).

GEOG-4231(3) TOPICS IN BIOGEOGRAPHY (S3) This course provides a synthesis of the geographical aspects in the development and concepts within biogeography and shows how descriptions or analysis of the delicate balances within the biosphere can be approached through the use of ecological principles. Particular attention will be given to inadvertent modification of the biosphere.
PREREQUISITES: GEOG-3215(3), or GEOG-2213(3) and GEOG-2214(3) and permission of the instructor, or the former GEOG-2203(6) and permission of the instructor.

GEOG-4232(3) CONSERVATION (S3) Humans have affected, and are still affecting adversely the natural-biological resources such as water, soils, biota, and natural ecosystems. This seminar will examine such topics as sustainable development, biological diversity, soil erosion, agroforestry, forestry, and ecosystem destruction, in order to better understand both the problems and potential solutions. Public-governmental attitudes towards conservation of our biological resources also will be examined. (This course alternates with GEOG-4231(3).)
PREREQUISITES: GEOG-3215(3), or GEOG-2213(3) and GEOG-2214(3) and permission of the instructor, or the former GEOG-2203(6) and permission of the instructor.

GEOG-4320(3) PROJECTS IN GEOMATICS (S3) Students work in small groups to develop geomatics applications addressing selected planning, environmental management or research problems. Emphasis is on conceptual design of the selected application and implementation of a prototype solution using GIS and remote sensing approaches to problem solving. Students undertake team projects solicited from a number of external organizations through a team approach. Practical aspects of GIS project management such as team building, production of work plans and schedules, and the writing and presenting of final reports are introduced through this approach. Final results are presented in both oral and written format.
PREREQUISITES: GEOG-3307(3) or GEOG-4307(3), and GEOG-3319(3) or GEOG-4308(3), or permission of the instructor.

GEOG-4321(3) TOPICS IN GEOMATICS I (S3) This course provides a synthesis of the current developments within the field and study of geomatics as it relates to hyperspectral remote sensing. Particular attention is given to applications that have a focus on physical and urban systems. Additional topics are integrated where appropriate. Students are required to select an area of interest and lead class discussions based on their selections.
PREREQUISITES: GEOG-3307(3) or GEOG-4307(3), and GEOG-3319 or GEOG-4308, or permission of instructor

GEOG-4322(3) TOPICS IN GEOMATICS II (S3) This course provides a synthesis of the current developments within the field and study of geomatics with a focus on synthetic aperture radar for physical and urban systems. Additional topics within this course include LIDAR mapping, GPS surveying and advanced spatial analysis. Students are required to select an area of interest and lead class discussions based on their selections.
PREREQUISITES: GEOG-3307(3) or GEOG-4307(3), and GEOG-3319(3) or GEOG-4308(3), or permission of instructor

GEOG-4403(3) URBAN LAND USE DEVELOPMENTAL PROCESSES (S3) An investigation of the processes by which urban development occurs and a critical appraisal of resultant urban forms. Some consideration will be given to the evaluation of relevant theory and to the nature and effect of planning controls on urban form. This course alternates with GEOG-4404(3).
PREREQUISITES: GEOG-2414(3) or GEOG-2415(3) or the former GEOG-2404(6).

GEOG-4404(3) FIELD RESEARCH IN URBAN GEOGRAPHY (S3) This course investigates, examines and appraises the major varieties of primary and secondary materials available for the study of urban areas. Particular emphasis will be placed on the acquisition and evaluation of local material, and the course will therefore call for students to be engaged in field research. (This course alternates with GEOG-4403(3).)
PREREQUISITES: GEOG-2414(3) or GEOG-2415(3) or the former GEOG-2404(6).

GEOG-4407(3) ADVANCED TOURISM AND RECREATION GEOGRAPHY (S3) This seminar course is based on a selection of advanced readings on topics and problems dealing with recreational and tourism behaviour, the supply and demand for different types of recreational space and tourism facilities, and issues of sustainability. A research project may be required of each student.
PREREQUISITES: GEOG-2407(3) or GEOG-3411(3) or GEOG-2412(3).

GEOG-4409(3) ARCHITECTURE AND CITY PLANNING (Le3) This course explores the relationship between architecture and city form, function, and planning in the social and historical context of the 20th century. Planning theory and practice is more specialized and separated from architectural theory. Yet, architecture is an important visual and functional impact on the urban form of the city and its planning. The major architectural schools (e.g., Art Nouveau, Bauhaus, International Style) and the cultural avant-garde trends (e.g., Futurism, Surrealism, Situationism) and their relationship to and impact on city planning are surveyed.
PREREQUISITES: One of GEOG-2414(3), GEOG-2415(3), the former GEOG-2406(6), or permission of the instructor.

GEOG-4441(3) ADVANCED STUDIES IN ENVIRONMENTAL PERCEPTION (S3) This course will consist of seminars examining selected topics relating to perceptions of physical and cultural environments. It will review and evaluate methods employed by geographers in the field of environmental perception. Whenever possible, students will be encouraged to apply these methods to local problems in natural hazards, mental mapping, and landscape aesthetics. This course will be of interest to students with an orientation to either physical or cultural geography.
PREREQUISITE: GEOG-2408(3).

GEOG-4450(3) GEOGRAPHIC PERSPECTIVES ON ENVIRONMENT AND SUSTAINABILITYI (S3) This course considers geographic and environmental approaches to sustainable staples-based development, particularly as they apply to water, energy, and mining. Discussion begins by outlining change, complexity, uncertainty and conflicts associated with primary and derived resources, including those contributing to climate change. Important technological innovations and policy developments designed to address these challenges are contemplated. Topics include corporate social responsibility policies, public-private initiatives, community-based resource management, adaptive management, and social learning through public participation.
PREREQUISITES: Two of GEOG-2204(3), GEOG-2212(3), GEOG-3408(3), GEOG-3508(3), ENV-2603(3), or permission of the instructor.

GEOG-4701(3) DIRECTED READINGS IN HUMAN GEOGRAPHY (P) This course exposes students to contemporary and topical issues of human geography through authoritative readings compiled by the instructor. The student is required to produce a short dissertation.
PREREQUISITE: Permission of the Department Chair.

GEOG-4702(3) DIRECTED READINGS IN PHYSICAL GEOGRAPHY (P) This course exposes students to contemporary and topical issues of physical geography through authoritative readings compiled by the instructor. The student is required to produce a short dissertation.
PREREQUISITE: Permission of the Department Chair.

GEOG-4703(3) DIRECTED READINGS IN GEOMATICS (P) This course exposes students to contemporary and topical issues of geomatics through authoritative readings compiled by the instructor. Students are required to produce a short essay on a topic agreed upon by the instructor and the student.
PREREQUISITE: Permission of instructor.

GEOG-4801(3) GEOGRAPHY FIELD SEMINAR (P) This course deals with the practical methodologies and problems associated with field research. Students are introduced to the necessary skills required for the acquisition, analyses, and presentation of primary field data. In addition to oral and written presentations of their research, students are required to participate in an intensive 10 day field camp at an off-campus venue prior to the start of Fall Term lectures. Students should consult with the Chair of the Geography Department regarding the availability of this course and the location of field camp.
PREREQUISITES: GEOG-3330(3) and permission of instructor.

GEOG-4901(6) HONOURS GEOGRAPHY THESIS (P) The Honours thesis provides the student with the opportunity to design and complete an original research project on a subject of interest and relevant to the discipline. In addition to completing the project, students in this course are expected to meet with a faculty supervisor on a regular schedule throughout the academic year. Presentation of the research results verbally and in thesis form to the Geography Department is an integral part of the course.
PREREQUISITES: GEOG-3330(3) (Research Methods in Geography), 36 credit hours completed in Geography, Geography GPA of 3.0, and permission of Department Chair.

Experimental Course Descriptions

GEOG-2418(3) Health Geography (Le3) This course is an introduction to the sub-discipline of health geography and is designed to explore how the geographical focus on place contributes to a better understanding of health and well-being. The course is structured to examine both ecological perspectives of the relationship between humans and disease, as well as how the social, built, and natural contexts of the environment in which we live have profound effects on health and health care. Concepts within health geography will be synthesized to consider its potential as an approach for health-related research. Additionally, the use of geographic techniques and tools will be explored including mapping, spatial analysis and qualitative inquiry.
PREREQUISITES: GEOG-1103(3), or permission of instructor

GEOG-2419(3) Resource Development and the Canadian Environment (Le3) This course examines the changing dynamics of natural resource development. In discussing different resources, including energy, extractive and consumptive industries, the course contrasts historic and modern approaches to development from a geographical perspective. Particular attention is given to the environmental consequences of primary resource production, as well as the role that these industries play in modern Canadian society.
PREREQUISITES: GEOG 1102(3) or ENV 1600(3) or permission of instructor

GEOG-4215(3) Projects in Earth Science (S3) This course discusses state-of-the-art geomatics techniques that can be applied to understanding and monitoring the Earth's surface environment, as well as other planetary surfaces. These include techniques for monitoring water quality, vegetation health, greenhouse gases, and planetary surface mapping. Lectures are supplemented by inidividual research projects that apply geomatics concepts to particular aspects of terrestrial and planetary monitoring.

GEOG 4415(3) Power, Knowledge, Geography (S3) This course examines the power of geographical ideas in shaping social values and understandings. Seminars focus on analyzing spatial formations of various historical and contemporary topics such as colonialism, nationalism, warfare, popular culture, science, racism, surveillance, the body, genocide, the climate crisis, and fundamentalism among others. Students are asked to consider how 'the production of space' accompanies and influences the production of knowledge, revealing connections between geography and power.
PREREQUISITES: GEOG-2408(3) or GEOG-2416(3) or GEOG-3330(3) or GEOG-3415(3), or permission of instructor.