



Inventory of Disaster Management Education in Major Canadian Universities

L. Falkiner

March 2003

ICLR Research
Paper Series – No. 30

ISBN 0-9732213-8-0

ACKNOWLEDGEMENTS

This paper was made possible through the support of the Office of Critical Infrastructure Protection and Emergency Preparedness and the Institute for Catastrophic Loss Reduction.

The **Office of Critical Infrastructure Protection and Emergency Preparedness (OCIPEP)** is a civilian organization operating within the Department of National Defence, whose mission is to enhance the safety and security of Canadians in their physical and cyber environments. In support of this mission, the Division of Research and Development promotes research in the areas of critical infrastructure protection (CIP) and emergency management (EM). Playing a leadership role in supporting hazard research, OCIPEP is looking to improve understanding of these issue areas and to develop solutions that will help manage, reduce, or mitigate Canada's exposure to risk and losses due to disasters, and enhance response capabilities to all hazards.

The **Institute for Catastrophic Loss Reduction (ICLR)** is a research organization, established by Canada's property and casualty insurers and the University of Western Ontario specializing in disaster prevention research. ICLR is committed to conducting quality, multi-disciplinary research that looks to understand the triggers of natural disasters as well as identifying effective ways to reduce the impact of these events on our social, economic and cultural lives. To this end ICLR has strategically supported research activities at Universities across Canada, concentrating on four research priority areas:

- Reducing wind and earthquake damage to housing, buildings, and infrastructure.
- Understanding risk management and prevention
- Enhancing government science related to natural disasters
- Improving community actions for disaster prevention

© HER MAJESTY THE QUEEN IN RIGHT OF CANADA (2003)
as represented by the Minister of National Defence

EXECUTIVE SUMMARY

Over the next decades, an increasingly volatile climate, changing risk from natural and human-induced hazards and shifting employment demographics will contribute to a greater demand for emergency and disaster professionals in Canada. Education must be a key component in a strategy to meet this demand. In this study, the author conducted an audit of course descriptions within six social science disciplines at thirty-eight Canadian universities to assess the availability of disaster management education in Canada. The results of the audit indicate that disaster-related courses are rare and are poorly distributed among the six disciplines. Recommendations to address this shortfall include:

- Greater emphasis on hazards and disaster management within the identified disciplines;
- Creation of targeted disaster education modules, to be integrated into existing curriculum;
- Further research into the availability of disaster-related courses in the natural sciences and remaining social science disciplines.

Scientific evidence indicates that as the climate changes, the frequency and intensity of weather-related hazards will rise significantly (Bruce et al 1998). In addition to a more volatile natural environment, aging urban infrastructure and an increasingly complex and interdependent network of technological systems have created a multitude of hazards to which humans are vulnerable. However, the number and types of hazards are only part of the equation. Human factors such as the proximity of people and property to hazards, failure to incorporate resiliency in design and construction and general apathy towards emergency management play an equal or greater role in the sharply rising impacts of disasters (Kovacs & Kunreuther, 2001).

Increasing vulnerability has been starkly demonstrated through global annual losses from natural disasters, which have swollen from US\$3.9 billion to US\$40 billion between the 1950s and the 1990s (IPCC 2001). If unabated, projections for future losses look bleak, estimated to reach as high as \$100 billion a year over the next century (MunichRe 1999). In addition to the economic losses, the 1990s witnessed 2,500 natural disasters killing more than 650,000 people and directly affecting 2.1 billion people (International Federation of Red Cross and Red Crescent Society, 2001).

It is clear that active efforts are required to curb the upward trend in disaster losses, but in many cases environmental hazards cannot be physically controlled or contained. Therefore a focus on reducing vulnerability through pre-hazard mitigation and public education is needed to ensure the safety of Canadians and protect the integrity of critical infrastructure systems. Decision-making must include an assessment of whether actions augment or abate vulnerability.

It is the position of this study that disaster management education can provide the foundation on which this goal can be realized. Through disaster management education, awareness of hazards and their impacts can be enhanced, along with fostering leaders to spearhead Canadian hazard vulnerability reduction. If delivered within the context of a particular university discipline, disaster management education can be used to cultivate a contextual understanding of vulnerability reduction, as well as help the student understand how he or she can contribute to this goal within his or her chosen area of study.

DISASTER MANAGEMENT EDUCATION

The term ‘disaster management education’, as used herein, refers to the transfer of knowledge and the facilitation of understanding regarding the management of hazards and disasters; specifically, recognition of natural and human-induced hazards and reduction of vulnerability.

Disaster education should be conceptually distinguished from training, in that it purports to step beyond the “transfer of skill from a trainer (i.e., instructor or facilitator) to a learner” (Kuban 2001). Recognizing the immense value of Canadian training programs that help individuals, groups and communities learn about hazards, prepare for emergencies and plan for disaster recovery, it is suggested herein that disaster management education must also be encouraged within Canada’s post-secondary institutions. Universities are in a unique position to facilitate information-sharing regarding hazards and disasters, serving as an information hub and functional link between government agencies, private sector organizations and the public. University programs generally permit students to take courses from a variety of different

disciplines, which creates a multidisciplinary environment that provides fertile ground for innovative ideas and solutions that can be applied to reducing society's vulnerability to hazards. University programs are particularly well suited for delivering disaster management education, as the professor can capitalize on the enthusiasm and free exchange of ideas that is encouraged among students in this less-structured learning format.

CONTEXT

Climate change is contributing to more volatile weather patterns and greater hazards which communities must prepare for and adapt to (McBean 2003). This has led to a broader understanding of the impacts of disasters on communities and a greater recognition of the need to reduce vulnerability, prompting legislative changes in a number of jurisdictions. The jurisdictions demonstrating leadership in this area are the provinces of Quebec, Alberta and Ontario who now require each municipality to create an emergency management program, complete with hazard assessment, emergency plans, training and exercises (Government of Ontario 2002). The creation of such a program will undoubtedly require the efforts of qualified individuals who possess knowledge about hazards and disasters and are familiar with methods to reduce their impact.

Moreover, disaster management, like most other fields, is likely to be affected by Canada's general employment demographics over the next few decades. As the "baby boomer" generation ages, the number of people retiring from emergency management can be expected to surpass the number of new entrants into the field, thus increasing the demand for hazard professionals in Canada.

The combination of these variables highlights the importance of succession planning and devising early strategies to address the coming need. Universities can be used as a means to combat the anticipated shortfall of disaster management professionals. According to the Association of Universities and Colleges of Canada, university enrolment is expected to rise significantly (20-30 %) over the next decade (AUCC 2002). While this presents a tremendous opportunity to reach a wide audience of undergraduate students within many academic disciplines, initial groundwork is required in order to capitalize on it. Existing resources must be harnessed and new resources must be coordinated to facilitate the communication of a common message: identify hazards, assess risk, and mitigate vulnerability.

METHODOLOGY

In order to develop a strategy for university-based disaster management education in Canada, it is necessary to first assess what currently exists. As such, the initial task was to audit the course descriptions of a list of universities and document the availability of courses that deal with disasters. The thirty-eight schools used in the audit were selected to include all of Canada's major universities, as well as schools that were more likely to have courses which address disaster management concerns. In addition, an effort was made to ensure regional representation.

One of North America's leading social hazard researchers, Dennis Mileti, recently projected that a post-graduate degree will become a basic requirement for entry into all levels of the hazard

management profession (Mileti, 2002). Currently, however, in the hazard academic community, where graduate training is already mandated, there is an under representation of social science scholars relative to their natural science counterparts. One explanation for this could be a relative lack of undergraduate courses that address disaster-related information in social science programs. To investigate if this was so, the audit sought to review undergraduate courses from six social science disciplines, namely economics, geography, planning, political science, psychology and sociology.

In reviewing each discipline, course descriptions were scanned for general keywords such as “hazard”, “risk” or “disaster”, as well as specific emergency words like “terrorism”, “security”, “extreme weather” and “humanitarian”. Relying on keywords alone would have painted an unrealistic picture of the availability of courses, thus some courses were included or rejected more selectively, based on a reading of the course description within the context of Canadian disaster management. For example, some courses that were included focus on a topic strongly related to disaster management but do not have an explicit reference to one of the keywords in the description. In other cases, course descriptions contained disaster-related keywords such as “conflict” or “death”, but were rejected because the topics were addressed within an unrelated context, such as war.

FINDINGS

This paper provides a review of undergraduate university courses in thirty-eight of Canada’s largest universities (see Appendix A). A total of 100 courses were identified that included some hazard education, an average of less than 3 courses per university. Geography accounts for 74 of the undergraduate social science courses identified, with the other fields – political science, sociology, psychology, planning and economics – providing very little if any disaster management education. Indeed, seven of the thirty-eight schools audited offered no disaster-related courses in any of the six social science faculties (see Table 1.0 for a complete listing of the results).

The distribution of the courses among faculties is poor. The large majority of the courses from geography examined the physical nature of hazards such as severe weather, earthquakes and floods, but few addressed management or mitigation of these hazards. Two notable exceptions include University of British Columbia’s *Natural Hazards Analysis*, which combines a focus on physical properties of natural hazards with an introduction to risk and vulnerability analysis; and *Catastrophes Naturelles et Risques Anthropiques* at Université du Québec, which addresses physical hazards as well as human responses to reduce the impacts of disasters.

Outside of geography, the other disciplines are vastly underrepresented. Economics and planning generated the fewest disaster-related courses, despite the tremendous economic implications of disaster losses. In Canada, primary responsibility for emergencies lies at the local government level; moreover, it is at this level that hazards are best assessed and managed to avoid disasters. In light of the important role that local planning plays in this process, it was hoped that courses would be available for planning students to learn about hazards and disasters and recognize the importance of vulnerability reduction in the community planning process. The findings are rather disappointing, with relatively few schools offering *any* undergraduate courses in planning. Only

Ryerson University and University of Windsor offer courses that address issues related to hazards or disasters, concentrating on risk and impact assessment in land use planning.

The role that local governments play in emergency management is particularly relevant for students in political science, focusing on public administration and public policy. Despite this, the audit found only 8 courses available in this discipline. Of the courses identified most address topics within an international context, such as post-conflict humanitarian relief. Relevant courses set within a domestic context are primarily centered on environmental hazards.

Disasters can result in serious psychological effects on people; however, the audit revealed virtually no courses from the faculty of psychology. Three identified courses, they addressed psychological attitudes and beliefs about the environment, while the others focus on the psychological component of risk and risk-taking.

Given the many sociological issues related to disasters (e.g., social response to disasters, community disaster recovery, community stress, hazard communication, and risk behaviour), it was expected that the audit would reveal a wider selection of courses in sociology than would be found in other disciplines. The sociology courses available are indeed diverse, with themes ranging from a broad discussion of human interaction with the natural environment to a specific focus on emergency response systems, but the availability of these courses is poor, numbering only seven in total.

CONCLUSIONS AND RECOMMENDATIONS

An increasingly volatile climate, rising disaster losses and the implications of Canada's changing employment demographics indicate that more people educated in disaster management will be required in the future to prepare communities for emergencies, mitigate hazards, reduce local vulnerability and conduct hazard research. Unfortunately, this introductory analysis suggests that the current availability of disaster-related courses in Canadian universities is insufficient to meet the growing demand of disaster management professionals in Canada.

To correct this, the author recommends that greater emphasis be placed on hazard and disaster management education within existing disciplines. One avenue of accomplishing this goal is to develop and implement disaster management education modules. In reviewing course descriptions for this study, it became evident that there are many types of courses that would make a receptive forum for targeted hazard education to be inserted. For example, virtually every school in the study offers courses in public policy or public administration, any of which could accommodate a case study examining disaster management as a local government function. The modules could be linked to topics the students are familiar with, drawing on previous knowledge and applying it to disaster management.

Additionally, future research to assess the availability of disaster-related courses in the natural sciences as well as graduate programs currently offered in Canada is essential. We must understand what currently exists before forward progress can occur. In order to reduce the impacts of hazards that threaten Canadian's lives and property, it is imperative that people understand their role in vulnerability reduction. Active integration of disaster management

education into the university system is a necessary first step towards fostering the development of disaster management professionals and establishing a culture of preparedness in Canadian communities.

References

Association of Universities and Colleges of Canada. (2002). University Teaching Capacity. Retrieved January 20, 2002 from World Wide Web: http://www.aucc.ca/en/innovation/teaching_capacity.pdf.

Bruce, James P., Ian Burton and I.D. Mark Egener. (1998). Disaster Mitigation and Preparedness in a Changing Climate. ICLR Research Paper Series No. 2. Prepared for Emergency Preparedness Canada, Environment Canada, Insurance Bureau of Canada and the Institute for Catastrophic Loss Reduction. Toronto: Institute for Catastrophic Loss Reduction.

Government of Ontario. (2002). Bill 148: Emergency Readiness Act. 3rd Session, 37th Legislature. Chapter 14, Statutes of Ontario. Retrieved December 19, 2002 from World Wide Web: http://www.ontla.on.ca/documents/Bills/37_Parliament/Session3/b148ra.pdf.

International Federation of Red Cross and Red Crescent Society. (2001). World Disaster Report 2000. Day, M & Walter, J(edits). Geneva, Switzerland.

International Panel on Climate Change. (2001). Climate Change 2001: Impacts, Adaptation, and Vulnerability. IPCC, Geneva, Switzerland.

Kovacs, Paul & Howard Kunreuther (2001). Managing Catastrophic Risk: Lessons from Canada. ICLR Research Paper Series No.13.

Kuban, Ron. (2001). Dialogue on Crisis: The Need for "Education" Too. ICLR Research Paper Series No. 5. Toronto: Institute for Catastrophic Loss Reduction.

McBean, Gordon. (2003). Climate Change and Severe Weather: A Basis for Action. Natural Hazards. Forthcoming.

Mileti, Dennis (2002). Speech delivered at Institute for Catastrophic Loss Reduction workshop. November 2002.

MunichRe. (1999a). Topics 2000. Natural Catastrophes: The current position. Munich Reinsurance Company, Munich. Retrieved January 2, 2003 from World Wide Web: http://www.munichre.com/pdf/topics_SH2000_e.pdf.

APPENDIX A – UNIVERSITY PROFILES

UNIVERSITY OF ALBERTA

No disaster-related courses in any of the six faculties

ACADIA UNIVERSITY

No disaster-related courses in any of the six faculties

BISHOP'S UNIVERSITY

ENVIRONMENTAL STUDIES AND GEOGRAPHY 125A - THE EARTH'S CRUST

The course is a general study of the materials and dynamics of Earth's crust. Included are geologic and topographic maps, geological time scales; an examination of minerals and fossils, igneous, metamorphic and sedimentary rocks; discussion of processes such as: sedimentation, vulcanism, plutonism, deformation and seismology; and, an introduction to plate tectonics, orogenies.

ENVIRONMENTAL STUDIES AND GEOGRAPHY 224A - HUMAN IMPACT ON THE ENVIRONMENT

Changing environmental relationships in the modern context of population growth and technological advance. The human impact on the world's atmosphere and climate, water, land and soils, vegetation, and animal life.

ENVIRONMENTAL STUDIES AND GEOGRAPHY 265B - THE ATMOSPHERE AND WEATHER

A comprehensive description of the principal characteristics of Earth's atmosphere including air temperature, density, pressure and moisture; the development of clouds, wind and precipitation, and physical explanations of weather events such as mid-latitude cyclones, thunderstorms and hurricanes. An introduction to weather-forecasting is included.

ENVIRONMENTAL STUDIES AND GEOGRAPHY 266B - ENVIRONMENTAL POLICY

An introduction to the field of environmental policy, with an emphasis on the regulation of technological hazards. Consideration will also be given to different approaches to environmental policy, including "command-and-control" regulation and enforcement as well as the emergence of market incentives and voluntary initiatives. Topics will include: air quality, water quality, solid and hazardous waste, toxic substances, pollution-prevention and environmental assessment.

ENVIRONMENTAL STUDIES AND GEOGRAPHY 363B - NATURAL HAZARDS

The course is an examination of the occurrence, nature and explanation of hazardous natural processes. Attention will be given to defining natural hazards, describing their physical characteristics and discussing, in less detail, the human response to these events. Geological hazards, such as earthquakes, floods and volcanoes, and climatological hazards, such as hurricanes, tornadoes and blizzards, will be studied.

ENVIRONMENTAL STUDIES AND GEOGRAPHY 365 - MID-LATITUDE WEATHER SYSTEMS

Examination of several of the major factors in mid-latitude cyclogenesis including: air masses, upper and middle atmospheric structure, baroclinic instability, vorticity, divergence and geostrophic flow. Discussion of normal and extreme weather events such as blizzards, thunderstorms, extra-tropical cyclones, tornadoes and Nor'easters. An introduction to weather forecasting and weather on the internet.

POLITICAL SCIENCE 242A - INTERNATIONAL ORGANIZATIONS: PRINCIPLES, INSTITUTIONS AND POLITICS

A study of the origins, structures and processes of institutions designed to resolve world conflict and secure international cooperation. The United Nations and Regional Organizations will be examined.

UNIVERSITY OF BRITISH COLUMBIA

GEOGRAPHY 316 - GEOGRAPHY OF NATURAL HAZARDS

The role of geophysical events, human ecology, environmental perception, world social and political order in explaining the risk of natural disasters. Assessment of acceptable risk, disaster relief and reconstruction and contrasts between developed and developing nations.

GEOGRAPHY 404 - NATURAL HAZARDS ANALYSIS

Description, analytical methods, case histories and environmental aspects of natural hazard mitigation. Extreme event statistics, mountain slope hazards, flooding, earthquake, risk mapping and decisions, zoning, vulnerability analysis.

POLITICAL SCIENCE 351 - ENVIRONMENTAL POLITICS AND POLICY

Domestic and international determinants of environmental policy; alternative approaches to environmental protection. The sustainable development paradigm; public opinion and interest group pressures; risk assessment; mandatory, voluntary and market-based policy instruments.

UNIVERSITY OF NORTHERN BRITISH COLUMBIA

No disaster-related courses in any of the six faculties

BRANDON UNIVERSITY

GEOGRAPHY 254 - AN INTRODUCTION TO HYDROLOGY

Water; too much, too little, too dirty -- This statement summarizes the fundamental hydrological problems faced today. However, before these problems can be studied, the hydrologist must have an understanding of the Earth-Atmosphere Hydrological System. This course introduces the student hydrologist to the components and processes of the Hydrological Cycle. In particular, topics include: precipitation, evaporation, infiltration and the flow of water over and beneath the earth's surface. Applied aspects of the course include the climatological water balance, stream hydrograph analysis and flood forecasting.

GEOGRAPHY 275 - POLLUTION BIOLOGY

This course provides an overview of the ecological impacts of natural and anthropogenic pollutants on terrestrial and aquatic ecosystems. Lectures and discussion sessions will deal specifically with the effects of heavy metals, acid rain, air pollutants, herbicides and pesticides, radiochemical, chlorinated hydrocarbons, and eutrophication on individual organisms, populations, communities, and ecosystems.

GEOGRAPHY 290 - GLOBAL ENVIRONMENTAL CHANGE

An investigation of the principal biophysical, social and economic impacts of the global climatic and other environmental changes brought about by human activities and natural processes. Particular attention will be directed to the understanding of climate-society interactions and their effects upon space, life and the human-use of resources. The implications for environmental and developmental policies will be reviewed.

GEOGRAPHY 292 - GEOGRAPHY OF WATER RESOURCES

Water as a world resource: its use and abuse by humans and problems caused by conflicting demands for water use; problems caused by over-abundance of water (floods) and shortages of water (drought); flood prevention and control, and some possible solutions for water shortages; minor compared with major water resource projects illustrated by reference to some major Canadian water resource schemes; Canadian water law.

GEOGRAPHY 295 - NORTH AMERICAN WEATHER SYSTEMS

Weather affects everyone and nobody escapes its whimsical and capricious nature. The most we can hope for is a reliable source of weather information; one which is consistent, comprehensive, and as accurate as present technology permits. This requires that individuals have a general understanding of weather systems in order to interpret the broadcast weather information. This course focuses on the historic and contemporary aspects of weather systems analysis. Topics include interpretation of the weather map, weathercasting, the significance of upper air circulation patterns (the jet stream), and thunderstorm, tornado, and hurricane models.

GEOGRAPHY 379 - GROUNDWATER: AN INTRODUCTION TO HYDROGEOLOGY

Groundwater contamination will probably become one of the most important environmental concerns over the next several decades. Topics covered include: geological materials and aquifers; principles of groundwater flow; groundwater flow to wells; regional groundwater flow and subsurface geology; groundwater development and contamination; introduction to groundwater modelling.

GEOGRAPHY 391 - ENVIRONMENTAL DISASTERS: APPRAISALS AND RESPONSES

A study of geographical and societal aspects of natural disasters, focusing upon the socio-economic and cultural components of the disaster process. Examines vulnerability and risk to environmental calamities, human appraisals and responses, post-disaster impact and prevention, mitigation, and management options. Examples will be drawn from contemporary problems regarding droughts, floods, cyclones, earthquakes and similar environmental risks.

GEOGRAPHY 393 - LAND USE PLANNING

An examination of the history and problems of land use. A study of the principles and practices of regional planning. The fundamentals involved in any approach to planning will be illustrated by means of Canadian case studies relating to economics, resource development, watershed conservation, changing land use, and characteristics of site and situation.

GEOGRAPHY 454 - APPLIED HYDROLOGY

An hydrological model simulates the effect of an actual or hypothetical set of processes and forecasts one or more possible outcomes. Applied Hydrology offers a hands-on approach to several hydrological and hydraulic design models in current use. Lectures will review the theory associated with each computer model. Topics include computer simulation in Watershed Hydrology, Floodplain Hydraulics, Flood Frequency and Risk Analysis, Stormwater Management and Hydraulic Structure Design.

PSYCHOLOGY 282 - ENVIRONMENTAL PSYCHOLOGY

Lectures and seminar periods devoted to the examination of the influence of environment upon individual perception and behavior. Topics will include a consideration of the effects of diverse environmental variables ranging from socioeconomic status, cultural and linguistic influences, to the physical design of buildings. An attempt will be made to relate these multiple influences on the perception of and the adaptation to the environment within a meaningful, theoretical framework. Current research in this rapidly developing field will be examined in depth. Field experience and laboratory sessions will be scheduled as required.

PSYCHOLOGY 366 - COMMUNITY PSYCHOLOGY I

This course is designed to introduce students to the theory and practice of community-level intervention approaches targeted towards the improvement of functioning by dysfunctional individuals, and for the proactive prevention of psychological disorders in the general population. Emphasis will be directed towards: (1) the analysis of social systems and their influence on individual behavior, (2) psychosocial theories of stress and adjustment, (3) the dynamics of risk-taking behavior, and (4) the study of social action ethics, philosophies, and practices.

BROCK UNIVERSITY

GEOGRAPHY 4P13 - RESEARCH TOPICS IN CLIMATIC HAZARDS

Special topics relating to climatic hazards, their impacts and societal adjustments.

GEOGRAPHY 4P20 - SNOW AND ICE HYDROLOGY

Hydrological processes involving snow, ice and frozen ground and their place in a geographical and environmental context. Topics include snowfall and drifting snow, the formation and evolution of the snow pack, snowmelt, avalanches, ice growth and decay on lakes and rivers, ice jams, glaciers and glacial hydrology; ground ice and permafrost hydrology.

UNIVERSITY OF CALGARY

GEOGRAPHY 405 - APPLIED CLIMATOLOGY

Role played by weather and climate in determining environmental quality. Storms, floods, droughts and human adjustment to severe weather. Urban and rural climates, air pollution. Climate in agriculture and forestry. Implications of Canada's climate(s) for the nation's water resources, agriculture and forests.

GEOGRAPHY 435 - SURFICIAL DEPOSIT, TERRAIN AND HAZARD MAPPING

A laboratory and field-oriented course in the recognition and mapping of surficial sedimentary deposits, terrain (geomorphic) units, environments of deposition and natural hazards from aerial photography, satellite imagery, other data sources and field surveys. Field work component will involve sediment texture and facies identification, trenching, augering, vibracoring, ground penetrating radar and electrical resistivity methods.

GEOGRAPHY 515 - APPLIED HYDROLOGY

Dam and reservoir water management, irrigation forms, stream routing and flood control, municipal water supply, well development and water conservation. Canadian water resources are emphasized.

CARLETON UNIVERSITY

GEOGRAPHY 2101 - ENVIRONMENTAL GEOGRAPHY

Biophysical elements of the environment; human-environment interactions; natural hazards; human response to environmental change and variation; land-use planning and risk management.

CONCORDIA UNIVERSITY

GEOGRAPHY 274 - THE NATURAL ENVIRONMENT: LAND AND LIFE

This course introduces the Earth's lithosphere and biosphere through an examination of their structural components, processes, and variability through space and time. Topics include the tectonic system, volcanic activity, landscape and landform development, soils, biogeochemical cycling, succession, and biomes.

GEOGRAPHY 375 - HYDROLOGY

The course introduces students to water as an agent of transformation of the landscape. It is based on the use of fundamental concepts from the analysis of systems and from process studies. The course aims at understanding the mechanics of processes governing the motion of water on hillslopes and in rivers. Theoretical concepts are presented in a lecture format, while the analysis of hydrological data through practical assignment provides an appreciation of the real-world manifestation of these concepts.

DALHOUSIE UNIVERSITY

No disaster-related courses in any of the six faculties

UNIVERSITY OF GUELPH

GEOGRAPHY 2210 - ENVIRONMENT AND RESOURCES

This course examines the interrelationships between people and biophysical processes. The main themes are: 1) characteristics of natural resources and processes through which they are developed and used and 2) human response to environmental conditions, including natural hazards and global change. Contemporary Canadian case studies will be presented at the regional and national scales.

GEOGRAPHY 3020 - GLOBAL ENVIRONMENTAL CHANGE

Major global environmental change issues, such as climate variability, deforestation and desertification, are addressed by examining related biophysical and human processes. Natural hazards such as flooding are also considered. Building from an understanding of resource analysis and policy making, the interrelationships between scientific investigations and policy initiatives are stressed.

GEOGRAPHY 3210 - MANAGEMENT OF THE BIOPHYSICAL ENVIRONMENT

An examination of resource management, focusing on public and private decision-making processes. Consideration of techniques for evaluating resources, including EIA and risk analysis. Emphasis is on the economic, social and environmental implications of resource development and use. Contemporary Canadian case studies will be presented at appropriate scales.

GEOGRAPHY 3610 - ENVIRONMENTAL HYDROLOGY

An introductory course in hydrology, the study of water in the environment. Emphasis is placed on understanding and modelling the hydrologic cycle. Topics include hydrologic processes, water resources, and case studies of freshwater systems.

LAKEHEAD UNIVERSITY

GEOGRAPHY 3531 - BEHAVIOURAL GEOGRAPHY

Examination of the role of spatial cognition in geographical behaviour. The importance of mental maps, territoriality and stereotyping in spatial behaviour. Examination of cultural and personal variations in attitudes towards landscape in regional and world images and in reactions to natural hazards.

GEOGRAPHY 4451 - GEOGRAPHY OF RISK AND HAZARD

An examination of the geographic theories, constructs, frameworks and methods used in the study of risk and hazard. Emphasis is placed upon human-environment interaction in environmental and technological hazards.

UNIVERSITÉ LAVAL

No disaster-related courses in any of the six faculties

UNIVERSITY OF MANITOBA

GEOGRAPHY 053.244 - GEOGRAPHY OF NATURAL HAZARDS

Physical environmental hazards to human settlement and economy are examined with particular attention to meteorological, soil erosion, mass wasting, earthquake, and volcanic phenomena.

MCGILL UNIVERSITY

ECONOMICS 347 - ECONOMICS OF CLIMATE CHANGE

The course focuses on the economic implications of and problems posed by predictions of global warming due to anthropogenic emissions of greenhouse gases. Attention is given to economic policies such as carbon taxes and tradable emission permits and to the problems of displacing fossil fuels with new energy technologies.

ECONOMICS 405 - NATURAL RESOURCE ECONOMICS

Topics include: Malthusian and Ricardian Scarcity; optimal depletion of renewable and non-renewable resources, exploration, risk, and industry structure and current resources, rent & taxation. Current public policies applied to the resource industries, particularly those of a regulatory nature.

GEOGRAPHY 321 - CLIMATIC ENVIRONMENTS

The earth/atmosphere system, radiation and energy balances, governing meteorological processes. Movements and circulation of the atmosphere on a local and global scale. Resulting weather systems.

GEOGRAPHY 372 - RUNNING WATER ENVIRONMENTS

The course focuses on the physical habitat conditions found in streams, rivers, estuaries and deltas. Based on the laws governing flow of water and sediment transport, it emphasizes differences among these environments in terms of channel form, flow patterns, substrate composition and mode of evolution. Flooding, damming, channelisation, forestry impacts.

POLITICAL SCIENCE 450 - PEACEBUILDING

An examination of transitions from civil wars to peace and the role of external actors in support of these transitions. Topics will include the dilemmas of humanitarian relief, peacekeeping operations, refugees, the demobilization of ex-combatants, transitional elections and the politics of socio-economic reconstruction.

SOCIOLOGY 418 - HUMAN RIGHTS AND HUMANITARIANS

Human rights and humanitarian actors are increasingly important players in transitional and local politics. This course will study their motivations, methods of operations and effectiveness. Whose interest do they serve - victims of war, crisis, repression of the interests of powerful Western nations?

MCMASTER UNIVERSITY

GEOGRAPHY 2GG3 - NATURAL DISASTERS

A study of natural processes including plate tectonics, earthquakes, volcanoes, landslides, river erosion and climate change and their impacts on human populations.

GEOGRAPHY 2W03 - PHYSICAL HYDROLOGY: SURFACE

Hydrological processes including precipitation, snowmelt, slope runoff, streamflow and hydrological data analysis.

GEOGRAPHY 2WW3 - WATER AND THE ENVIRONMENT

Selected environmental issues related to water, including floods and droughts, irrigation, effects of water management projects and pollution. Examples from Canada and the world.

GEOGRAPHY 3J03 - CLIMATE CHANGE AND ECOSYSTEM IMPACTS

Past, present and future climate change is examined in terms of the underlying physical and global biogeochemical processes. The Kyoto Protocol and impacts of climate change on ecosystems are examined.

GEOGRAPHY 3W03 - PHYSICAL HYDROGEOLOGY

Mechanisms and processes of water movement in the subsurface including the saturated zone (groundwater) and the unsaturated zone (soil water).

GEOGRAPHY 4E03 - COASTAL ENVIRONMENTS

Coastal systems and their response to sea level change with an emphasis on the Quaternary; methods of reconstructing sea level change; environmental concerns in coastal areas.

GEOGRAPHY 4T03 - PLATE TECTONICS AND ORE DEPOSITS

Synthesis of plate tectonics, with application to crustal evolution and genesis of ore deposits.

MEMORIAL UNIVERSITY

GEOGRAPHY 3100 - CANADA'S NATURAL ENVIRONMENTS AND LANDSCAPES

This course examines the characteristics and development of the natural environments and landscapes of each of the major regions of Canada. The diversity of natural environments is illustrated through discussion of the climatic, hydrological, biogeographical, and geomorphic processes responsible for shaping the land. The impact of both gradual and rapid (catastrophic) changes on local, national, and global scales will be emphasized.

GEOGRAPHY 4160 - ADVANCED HYDROLOGY

Processes and analytical techniques in hydrology including flood frequency, groundwater flow and contaminant transport, and the hydrology of northern areas with special reference to permafrost and snowmelt. A combination of laboratory experimentation and fieldwork will provide data for supporting exercises.

UNIVERSITÉ DE MONTRÉAL

GÉOGRAPHIE 6145 - CLIMATOLOGIE

Changement climatique; science, impacts, adaptations, politiques. Impacts sur le climat et l'hydrologie, les ressources en eau et l'agriculture; politiques d'adaptation.

MOUNT ALLISON UNIVERSITY

No disaster-related courses in any of the six faculties

UNIVERSITY OF NEW BRUNSWICK

No disaster-related courses in any of the six faculties

NIPISSING UNIVERSITY

No disaster-related courses in any of the six faculties

UNIVERSITY OF OTTAWA

SOCIOLOGY 3105 - ENVIRONMENTAL SOCIOLOGY

Science and the redeployment of the forces of nature. Social action and the dynamics of nature. Environmental problems. Risk society.

SOCIOLOGY 4310 - GLOBALIZATION AND THE ENVIRONMENT

Study of the relations between social, cultural, economic and political globalization and the natural environment. Transnational environmental risks. Globalization of disasters and responses to disasters.

UNIVERSITÉ DU QUÉBEC À MONTRÉAL

GEOGRAPHIE 1062 - LE SYSTÈME CLIMATIQUE GLOBAL

Analyse des différentes composantes du système climatique global: atmosphère, hydrosphère, géosphère, et leurs interactions. Les caractéristiques et le rôle des composantes du système climatique global (approche, évaluation, mesure, variabilité, tendances à court, moyen et long termes). Le fonctionnement du système et répartition régionale. Les impacts des activités humaines sur le système climatique et les conséquences sur les bilans radiatif, énergétique et hydrique. Les changements climatiques. Les modifications biogéographique, agronomique et génétique. Le programme climatologique mondial. L'observatoire climatologique. Les conventions internationales sur les changements climatiques et la désertification.

GEOGRAPHIE 1124 - CATASTROPHES NATURELLES ET RISQUES ANTHROPIQUES

Connaître les sources de risques et maîtriser les diverses méthodes utilisées pour la gestion des risques anthropiques et des catastrophes naturelles. Les notions de risques et de sécurité. Identification des sources de risques d'origine naturelle : érosion et sédimentation rapides, mouvements de masse, phénomènes karstiques, séismes, activités volcaniques et néotectoniques, inondations et submersions, tsunamis, mouvements des glaces et des glaciers, déplacement rapide de masses d'eau ou de courants, présence de pergélisol, éléments climatiques soudains, désertification. Risques de société et technologiques : guerres, centrales nucléaires, accidents de transport, pollutions, feux de forêts, rejets inattendus de produits toxiques, ruptures d'alimentation en énergie. Analyse des risques et évaluation des dangers. Scénarios plausibles d'accidents et estimation de leurs conséquences. Mesures préventives : identification des zones à risque, information des populations, méthodes de veille. Représentations et réactions humaines pendant et après l'événement catastrophique. Mesures d'urgence et de sécurité civile en cas de cataclysme sur les plans technique, informationnel et social. Analyse de cas.

GEOGRAPHIE 3061 - HYDROCLIMATOLOGIE ET RESSOURCES EN EAU

Étude des paramètres hydroclimatologiques. Analyse des composantes physiographiques de bassins-versants. Les ressources en eau en relation avec les différents milieux naturels et modifiés (forestier, agricole, urbain). Les impacts des différents milieux sur les ressources en eau et leurs conséquences (érosion, sécheresse, inondation). La problématique de gestion des ressources en eau. Les normes, les institutions et les conventions internationales.

SCIENCE POLITIQUE 5910 - POLITIQUE DE L'ENVIRONNEMENT

Nature des problèmes environnementaux (causes historiques, sociales, politiques, économiques) et dimensions de ceux-ci (écologiques, sociologiques, économiques, politiques, juridiques, administratives et culturelles). Revue des politiques et des programmes environnementaux nationaux et internationaux et des institutions qui les supportent: -les différents secteurs touchés; -la nature des pouvoirs d'intervention; -leur impact sur l'environnement et le développement. Évolution des politiques environnementales au Québec: évolution des mentalités, configuration des groupes de promotion et de défense, instruments législatifs et réglementaires, consultations, audiences publiques, évaluation d'impacts, perspectives de réforme. Impacts des problèmes environnementaux sur les modes de gestion du secteur public. Impacts politiques et économiques des problèmes environnementaux. Étude des cas.

SCIENCE POLITIQUE 1183 - POLITIQUES ÉTRANGÈRES

Étude comparative de diverses politiques étrangères (grandes puissances, puissances de taille moyenne, pays en voie de développement, etc.). Analyse du contenu, de l'élaboration et de la mise en oeuvre de politiques étrangères. Présentation des principales approches utilisées dans le domaine. Analyse théorique et empirique de la prise de décision en matière de politiques étrangères. Étude des déterminants internes et externes (environnement, atouts, ressources, contraintes, etc.) ainsi que de leur interaction en matière de politiques étrangères. Dimensions socio-économiques, diplomatiques, culturelles, militaires, humanitaires... Caractéristiques propres aux politiques étrangères canadienne et québécoise (convergences et divergences).

PSYCHOLOGIE 5440 - PRÉVENTION ET INTERVENTION AUPRÈS DE POPULATIONS À RISQUE

Les objectifs de ce cours sont les suivants: Acquisition des notions de base sur le concept de risque. Connaître les éléments d'un programme de prévention et être capable d'en élaborer un. Identification des comportements à risque dans certaines populations. Éléments contextuels de vie. Facteurs individuels et environnementaux qui posent des risques pour le développement et le fonctionnement de la personne. Recherche des éléments de prévention et d'intervention pertinents à ces populations et à leurs problèmes. Effets à court, moyen et long termes. Les populations et risques étudiés pourront varier selon l'année où le cours est donné. L'approche sert de cadre et de modèle explicatifs des problématiques abordées.

PSYCHOLOGIE 5760 - PSYCHOLOGIE DE L'ENVIRONNEMENT

Les objectifs de ce cours sont les suivants: Initier les étudiants aux multiples facettes des relations entre l'individu ou le groupe et l'environnement, considéré d'un point de vue molaire. Faire acquérir les connaissances fondamentales développées en psychologie pour décrire, expliquer et modifier le comportement humain en relation avec l'environnement. Historique et caractéristiques du domaine sur les plans théorique et méthodologique. Cognition environnementale: cartographie cognitive, orientation spatiale. Comportement sociospatial: espace personnel, comportement territorial, sentiment d'entassement, régulation de la frontière entre soi et les autres. Psychologie écologique: cadres comportementaux et peuplement. Stresseurs environnementaux (bruit, chaleur, pollution). Évaluation environnementale: esthétique, adéquation personne/environnement, qualité de l'environnement. Intervention psycho-environnementale, effet sur l'aménagement. Attitudes et comportements proécologiques. Réactions aux catastrophes écologiques. Relations personne/environnement dans divers milieux: résidentiel, scolaire, professionnel, naturel, urbain, institutionnel. Problématiques particulières à certaines clientèles (par exemple: personnes âgées, personnes handicapées).

SOCIOLOGIE 6214 - ÉCOLOGIE SOCIALE

Évolution de la pensée écologique: du milieu naturel aux rapports hommes/nature. Impact du développement industriel sur les ressources et les conditions d'existence collective. Crises, restructurations, alternatives écologistes. Rapports entre la théorisation scientifique, la pensée idéologique et la pratique quotidienne. Mouvements écologiques et leur impact politique. Situation de la pensée et du mouvement écologique au Québec.

UNIVERSITY OF PRINCE EDWARD ISLAND

PSYCHOLOGY 333 - ECOPSYCHOLOGY

This seminar-style course examines the important role of the human relationship with nature in order to better understand psychological experience and ecological issues. It explores a variety of factors that may contribute to human disconnection from nature (such as technology, consumerism, psychological views of health and of the self) and ways of developing more sustainable relationships and deepening personal connections with nature (such as direct experience in nature, environmental restoration and activism, nature-based worldviews and psychotherapies, and systems theory).

QUEEN'S UNIVERSITY

GEOGRAPHY 210 - GEOGRAPHICAL PERSPECTIVES ON GLOBAL CHANGE

An interdisciplinary investigation of the causes and impacts of global changes brought about by human activities and natural processes. Includes human impacts on the atmosphere, soils, plants, animals, water and geomorphological processes; ecological relationships; natural resource management; and natural hazards.

UNIVERSITY OF REGINA

GEOGRAPHY 333 - NATURAL HAZARDS

Characteristics and human impacts of selected natural hazards. Risk evaluation and responses. General and case study approaches, with emphasis on atmospheric and geomorphic hazards in Canada and the developing world.

GEOGRAPHY 421 - TOPICS IN CLIMATOLOGY AND METEOROLOGY

Weather and human activities. Response to weather hazards: hurricanes, thunderstorms, droughts. World climate regions. Climate change. Human impact of weather, weather forecasting and climatological information. Anthropogenic effects on the atmosphere.

RYERSON UNIVERSITY

GEOGRAPHY 016 - INTERPRETING HUMAN ENVIRONMENTS

This course is designed to increase awareness of the importance of environmental and spatial factors in our lives as individuals, as members of communities, and as residents of the spaceship earth. Throughout the course a number of themes are examined. These include the concepts of distance, territoriality, boundaries, and spatial equity and issues related to urbanization, land-use change, environmental management, and global economic and environmental processes.

PLANNING 715 - ENVIRONMENTAL ASSESSMENT

This course introduces the concepts and methods of Environmental Assessment in Ontario. It examines the biological, economic and social impacts that are commonly associated with development activities and the means used to predict, evaluate and mitigate impacts in human and natural environments. It includes a review of the history of environmental assessment and its relation to environmental planning principles. It covers the basic elements of assessment; geophysical, biological and socio-economic impacts and their inter-relationships. The course concludes with a review of current practice in impact assessment and the major controversies in the field.

PLANNING 815 - FACILITY SITING & RISK ASSESSMENT

This course examines the problem of siting risk-generating facilities (power plants, waste storage facilities) in the environment and explores current approaches in dealing with risk in environment planning. It explores theory and practice of siting facilities, and assesses the role that risk assessment plays in the siting process. The course compares regional benefits with local environmental risks and examines the difference between objective and perceived risks. It reviews methods of risk analysis and assessment, and current practice in risk management.

ST. FRANCIS XAVIER UNIVERSITY

ECONOMICS 281 - ENVIRONMENTAL ECONOMICS

This course provides an introduction to the study of the relationship between human economic activity and the environment. The objective of the course is to familiarize students with the economic concepts used to analyse the causes, consequences, and possible solutions to some of the most pressing local and global environmental issues of the day. The course will cover a range of concepts: property rights; externalities; public goods; benefit-cost analysis; environmental valuation; and policies for environmental regulation. The course will apply these concepts to a number of local environmental issues: air and water pollution; toxic and hazardous substances; waste disposal; recycling; and the use of water and land. The course will also consider global environmental issues such as ozone depletion, biodiversity, and sustainability.

SOCIOLOGY 323 - ENVIRONMENT AND SOCIETY I: INTRODUCTION

In light of modern warnings of a global environmental crisis, this course re-examines the ways in which modern societies construct their relationship to the natural world. Students will be asked to question 'common sense' assumptions about the distinctness of social and natural phenomena. The course reviews human efforts to dominate and control environments in the pursuit of the comforts of modern life. Finally, it explores the uncontrolled consequences of these efforts in the form of social iniquities and emergent physical threats.

UNIVERSITY OF TORONTO

GEOGRAPHY 203H1 - INTRODUCTION TO CLIMATOLOGY

Introduction to the large scale processes responsible for determining global and regional climate and atmospheric circulation patterns, as well as the small scale processes responsible for determining the microclimates of specific environments.

GEOGRAPHY 206H1 - INTRODUCTION TO HYDROLOGY

An introduction to the hydrologic cycle with emphasis on the terrestrial branch; precipitation, evaporation, runoff, flood prediction; ground water and snowmelt hydrology. Basic hydrological models will be practiced.

GEOGRAPHY 307H1 - SOIL AND WATER: LANDSCAPE PROCESSES

An introduction to physical and chemical processes operating at micro to landscape scale and their effects on soil and water quality. Discussion of anthropogenic impacts and management and conservation issues. Local and international case studies.

GEOGRAPHY 314H1 - GLOBAL WARMING

A comprehensive examination of the greenhouse warming problem, beginning with economic, carbon cycle, and climate model projections; impacts on and adaptive responses of agriculture, forests, fisheries, and water resources; abatement options; technical and institutional issues.

GEOGRAPHY 332H1 - URBAN WASTE MANAGEMENT

This course examines 1) factors affecting the spatial distribution of wastes; and 2) models and policy implications inherent in all aspects of waste management, from waste generation through recycling and waste disposal. Contrasting waste management practices in the developed and the developing world is a central theme.

GEOGRAPHY 334H1 - WATER RESOURCE MANAGEMENT

Managing demand and supply; linkages between water quality and human health. Case studies from the industrial world and from developing countries, rural and urban. Implications of population growth and climate change for water resource management.

GEOGRAPHY 450H1 - MEDICAL GEOGRAPHY

The geography of health and disease. Environmental and behavioural factors in the causes and distributions of diseases. Mapping and modelling disease diffusion. Spatial distribution of health care resources and their utilization.

GEOGRAPHY 103H1 - GEOLOGY IN PUBLIC ISSUES

Geologic hazards: earthquakes, volcanoes, landslides, tsunamis. The distribution and politics of natural resources, including petroleum and ore deposits. Nuclear power and nuclear waste disposal. Global change: the geologic record of hot and cold climates, and how the earth survives.

GEOGRAPHY 438H1 - SHALLOW CRUST GEOPHYSICS

An introduction to the geophysical exploration of the subsurface. Topics include gravity, seismic, magnetic, electrical and electromagnetic surveying and their application in prospecting, hydrogeology, and environmental assessments.

POLITICAL SCIENCE 346H1 - ENVIRONMENTAL CONFLICT AND SECURITY

The relationship between human-induced environmental stress and national and international security, with a special focus on the likelihood of environmentally related violence in the developing world. Some treatment of the technical aspects of global environmental change.

SOCIOLOGY 475H1 - EMERGENCY RESPONSE SYSTEMS PLANNING

Use of operational research and information technology to develop mathematical models and decision support systems to design and evaluate the performance of emergency response systems. Forest fire management systems are used to illustrate the basic principles of emergency response system planning that can also be applied to urban fire, police, and ambulance services.

TRENT UNIVERSITY

GEOGRAPHY 104H/WI – EARTH'S PHYSICAL PROCESSES AND ENVIRONMENTS

An examination of the atmospheric, tectonic and geomorphic forces that shape Earth's physical environments. Issues addressed include soil conservation, groundwater resources and climate change.

GEOGRAPHY 105H/WI – INTRODUCTION TO EARTH'S PHYSICAL ENVIRONMENTS

Course facilitates recognition of the atmospheric, tectonic and geomorphic forces that shape landscape, climate, water and soil resources, and thereby, social and economic activity.

GEOGRAPHY 240 – GEOLOGY

Principles of mineralogy, petrology and sedimentology, paleontology and structural geology; geophysics of the Earth's interior and recent developments in geomagnetism, seismology and global tectonics.

GEOGRAPHY 353H – HYDROLOGY

Study of the movement of water through the environment with emphasis on terrestrial aspects including interception, infiltration, soil moisture, groundwater, surface runoff and stream-flow, also covering human impact on hydrological processes.

UNIVERSITY OF SASKATCHEWAN

GEOGRAPHY 102.3 - INTRODUCTION TO GLOBAL ENVIRONMENTAL SYSTEMS: LANDSCAPES OF THE EARTH

A study of important elements of the global environment, emphasizing interactions between the atmosphere, lakes and oceans, and the earth's surface. Examines the processes operating beneath and at the earth's surface that shape the continents and ocean basins. Topics include plate tectonics, earthquake and volcanic activity, the hydrologic cycle, and the landforms created by the action of rivers, wind, glaciers, ground ice, and waves. Case studies are introduced to illustrate the impact of natural hazards on human populations.

SIMON FRASER UNIVERSITY

GEOGRAPHY 312-4 - GEOGRAPHY OF NATURAL HAZARDS

An introduction to the occurrence and origin of natural hazards such as volcanic eruptions, landslides, etc. Interaction between the relevant natural processes and society will be examined, as well as prediction of natural events and the amelioration of the effects of such events within different cultural contexts.

UNIVERSITY OF VICTORIA

GEOGRAPHY 370 - HYDROLOGY

Introduction to environmental hydrology focussing on processes of water movement in the hydrologic cycle via precipitation, interception, evaporation, infiltration, surface runoff, streamflow, and groundwater flow. Measurement and analysis of these processes. Applied aspects and local examples will be discussed. Involves laboratory assignments and a field-trip.

GEOGRAPHY 377 - APPLIED GEOMORPHOLOGY

A detailed examination of the social relevance of geomorphology, in which three areas receive emphasis: terrain analysis, terrain stability and natural hazards. Field trips and participation in a group research project are involved.

GEOGRAPHY 472 - DISASTER PLANNING

A detailed overview of disaster planning, including risk and comprehensive planning, microzonation, design safety, models for disaster prediction, warning systems, disaster plans, reconstruction, and trauma support. The course will involve lectures, seminars and research projects.

UNIVERSITY OF WATERLOO

GEOGRAPHY 208 - APPLIED CLIMATOLOGY

World climate and weather patterns and their impact on humanity. Topics include atmospheric circulation, climate classifications, air pollution, urban climate, climate change and weather modification.

GEOGRAPHY 402 - COASTAL GEOMORPHOLOGY

A seminar and field format will be used to investigate coastal environments, and the natural and anthropogenic processes that affect them. Shoreline hazards and management practices will be examined within the context of the Great Lakes and salt water environments. The impact of sea level rise; Arctic shorelines; and coastal dune systems will be discussed.

GEOGRAPHY 407 - ENVIRONMENTAL HYDROLOGY

This course will focus on the physical processes relating to various aspects of winter hydrological processes important to the Canadian setting, and consider various aspects of environmental change, both land-use and climate. A major fieldwork project will be undertaken to assess hydrological characteristics of a selected landscape, e.g. snowpack and winter processes. Students will work extensively with these data to produce a research paper. Other issues of hydrological change in the environment will also be covered.

PSYCHOLOGY 230 - PSYCHOLOGY AND LAW

Psychological principles drawn from a variety of subdisciplines (e.g., social, clinical, cognitive) will be surveyed in terms of their relevance and application to the legal system. Topics may include jury selection and decision-making, eyewitness testimony, insanity defense, competency assessment, risk assessment, and attitudes toward law and the legal process.

UNIVERSITY OF WESTERN ONTARIO

GEOGRAPHY 208 - WEATHER AND CLIMATE

Fundamentals of the physical processes underlying weather and climate; radiant energy, energy balances, clouds, atmospheric dynamics and thermodynamics; principles of the "Greenhouse Effect", mid-latitude cyclones and aspects of weather forecasting, severe weather phenomenon and atmospheric optics.

WILFRED LAURIER UNIVERSITY

GEOGRAPHY 231 - RISKS AND DISASTERS: A GEOGRAPHICAL INTRODUCTION

The course examines the nature of danger and disasters, the scope of the human vulnerability and responses to them. It will look at risk and damaging events associated with extreme natural forces, technological accidents, epidemic diseases and human conflict.

GEOGRAPHY 385 - NATURAL ENVIRONMENTS

This course is an in-depth examination of geocology, the distribution and geophysical characteristics of habitats: relation to energy, moisture and materials availability and circulations; ecosystemic properties of the major biomes; concept of the "natural regions"; background to the distribution of natural resources and hazards.

GEOGRAPHY 386 - SLOPE PROCESSES

A survey of mass wasting processes, including rockslides and rockfalls, mudflows, solifluction, soil creep and avalanches, and an examination of their relations, mechanics, magnitude-frequency and roles in the development of slopes and specific landforms.

GEOGRAPHY 396 - NATURAL HAZARDS

The nature and distribution of risk from geo-physical processes including floods, earthquakes, storms and droughts. Emphasis upon the incidence of damaging events and their relation to ecological setting, settlement patterns, land-use and contemporary socio-economic conditions.

YORK UNIVERSITY

GEOGRAPHY 3250 - ENVIRONMENTAL PERCEPTION AND NATURAL DISASTERS

This course assesses the way people perceive their environment. Initially the course considers the theory of environmental perception. Considerable emphasis is placed on appraisal of natural and technological hazards and cultural perception.

GEOGRAPHY 3770 - HOUSING POLICY

The course studies Canadian housing policy using the approaches of economics, political science and public administration. The course examines models of housing markets, the effects of housing policies, the politics and process of policy formation, and procedures for policy evaluation.

GEOGRAPHY 4160 - RISK ASSESSMENT IN RESOURCE MANAGEMENT

Theories and concepts of "risk" are discussed and evaluated critically with respect to public policy for the resources sector. The analytical framework employed distinguishes between risk estimation, risk evaluation, and risk management and communication activities. Resource management issues are analyzed with a focus on energy policy in Canada, in the context of environment-energy interactions.

POLITICAL SCIENCE 4170 - THE POLITICS OF SECURITY AND INTELLIGENCE

An examination of the nature of security and intelligence and its effect on policy making. Among topics studied will be disinformation, counter-intelligence strategies, internal security mechanisms, accountability and the relation between security and intelligence, democracy and peace.

POLITICAL SCIENCE 4670 - THE POLITICS OF CYBERSPACE

This course considers political implications of the new information technologies. Including: surveillance society; information as a commodity; private data banks; access to information versus intellectual property; state, regulation and control; intelligence and "infowar"; global networks and virtual communities; cyberspace and subversive imagination.

SOCIOLOGY 3710 - ENVIRONMENTAL SOCIOLOGY

This course explores sociological approaches to the interaction between humans and their bio-physical environment; the history of ecology and contemporary social ecologies; contending explanations for environmental problems; and the history of environmental movements and organizations.

UNIVERSITY OF WINDSOR

PLANNING 50-393 - ENVIRONMENTAL PLANNING

An introduction to the principles of sustainable development as applied to urban planning. This course will focus on the policies, standards, and practices used in creating and maintaining environmentally responsible communities. Topics will include growth management, mixed land use, adaptive infrastructures, alternative transportation, energy conservation, and waste management.

UNIVERSITY OF WINNIPEG

GEOGRAPHY 2210/3 - METEOROLOGY

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.

GEOGRAPHY 23.2212/3 - NATURAL HAZARDS

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 may include hurricanes, tornadoes, floods, earthquakes, and blizzards.

Inventory of Disaster Management Education in Major Canadian Universities

GEOGRAPHY 23.3210/3 - HYDROLOGY

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.

Table 1.0 Summary of Findings

Name of University	Geography	Sociology	Psychology	Planning	Economics	Political Science
University of Alberta	0	0	0	0	0	0
Acadia University	0	0	0	0	0	0
Bishop's University	6	0	0	0	0	1
University of British Columbia	2	0	1	0	0	1
Brock University	2	0	0	0	0	0
University of Calgary	3	0	0	0	0	0
Carleton University	1	0	0	0	0	0
Concordia University	2	0	0	0	0	0
Dalhousie University	0	0	0	0	0	0
University of Guelph	4	0	0	0	0	0
Lakehead University	2	0	0	0	0	0
Universite Laval	0	0	0	0	0	0
University of Manitoba	1	0	0	0	0	0
McGill University	2	1	0	0	2	1
McMaster University	7	0	0	0	0	0
Memorial University	2	0	0	0	0	0
Universite de Montreal	1	0	0	0	0	0
Mount Allison University	0	0	0	0	0	0
University of New Brunswick	0	0	0	0	0	0
Nipissing University	0	0	0	0	0	0
University of Ottawa	0	2	0	0	0	0
Universite du Quebec a Montreal	3	1	2	0	0	2
University of Prince Edward Island	0	0	1	0	0	0
Queen's University	1	0	0	0	0	0
University of Regina	2	0	0	0	0	0
Ryerson University	1	0	0	2	0	0
St. Francis Xavier University	0	1	0	0	1	0
University of Toronto	9	1	0	0	0	1
Trent University	4	0	0	0	0	0
University of Saskatchewan	1	0	0	0	0	0
Simon Fraser University	1	0	0	0	0	0
University of Victoria	3	0	0	0	0	0
University of Waterloo	3	0	1	0	0	0
University of Western Ontario	1	0	0	0	0	0
Wilfred Laurier University	4	0	0	0	0	0
York University	3	1	0	0	0	2
University of Windsor	0	0	0	1	0	0
University of Winnipeg	3	0	0	0	0	0
Totals	74	7	5	3	3	8