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Cover photo: Taupo Ignimbrite in road cutting by Prof Colin Wilson

WELCOME TO GEOGRAPHY, ENVIRONMENT AND EARTH SCIENCES

Mike Hannah, Head of School

If this is your first time at Victoria or if you are a returning student, welcome to the School of Geography, Environment and Earth Sciences (SGEES) and its graduate degree programmes. We offer Honours, Postgraduate Diplomas, Certificates, Masters and PhD programmes in Geography, Geology, Geophysics, and Physical Geography, and a specialised Masters, Postgraduate Diploma and PhD programme in Petroleum Geosciences taught with the Crown Research Institute – GNS Science. We also offer professional Masters Programmes, and PhDs, in Development Studies and Environmental Studies.

With New Zealand Met Service we teach a Postgraduate Certificate and a Postgraduate Diploma in Meteorology which is unique in New Zealand. In addition we have a generic diploma that allows you to pick up a new discipline if you have graduated in a different area.

All the School's staff will be supportive of your study and keen for you to succeed in your chosen programme. We hope you have no difficulties or concerns, but if these do arise please contact as soon as possible the Coordinator of the course at issue, or the Director of your degree programme, or A/Prof Mike Hannah, Head of School. They will all do their best to help.

STRUCTURE OF THE SCHOOL

The School of Geography, Environment and Earth Sciences was formed in 1997 as an amalgamation of the Departments of Geography, Geology, Geophysics and the Research School of Earth Sciences. In so doing it brought together staff with a wide range of interests in the science of the deep Earth, the Earth's surface and atmosphere, the environment and people's interaction with it, as well as geographical aspects of economic, social and cultural development. It also brought together the teaching programmes and the graduate research in these disciplines.

INSTITUTE OF GEOPHYSICS

The Institute of Geophysics provides a focus for teaching and research in geophysics at Victoria. It includes members of several Schools who have an interest in the physics of the solid and fluid Earth. The Institute also has associated members from the region’s research institutions who are collaborating with Victoria staff or otherwise contributing to Victoria's programmes. Particular interests and strengths include meteorology, geomagnetism and palaeomagnetism, seismology and seismic hazard assessment, tectonics and lithospheric structure. These strengths are maintained through vigorous programmes of research, including research by graduate students, in New Zealand and Antarctica. These make use of a wide range of field and laboratory equipment that includes broad-band and multi-channel seismographs, gravity meters, a fully equipped palaeomagnetic laboratory with cryogenic magnetometer, equipment for geomagnetic and geoelectrical exploration and laboratories for processing satellite imagery and reflection and refraction seismics.

ANTARCTIC RESEARCH CENTRE

The Antarctic Research Centre supports externally funded research on Antarctic climate history, and provides advice and expertise for University research in Antarctica. It contains a library of maps, as well as a range of purpose-built equipment for polar marine studies, such as winches, corers, oceanographic instruments and GPS surveying equipment.

Staff and students from VUW have gone to the ice each year since 1957 to carry out field studies for a variety of research projects. Normally three or four projects are carried out each year. Results are reported in student theses and scientific courses. Proposals for new research should be discussed with Centre staff and must be submitted to Antarctica New Zealand by September 30 each year for the summer field season 18 months ahead. Approval of projects carries with it a commitment from Antarctica New Zealand to provide travel, food and accommodation to and within Antarctica but funding for food, accommodation, clothing and transport to and from Christchurch, along with costs of scientific equipment, must still be found from University or other sources.

NZ CLIMATE CHANGE RESEARCH INSTITUTE

The Climate Change Research Institute was set up in 2008 to carry out interdisciplinary policy-relevant work on climate change issues. We are currently undertaking climate change research on issues relevant to New Zealand, especially on community vulnerability and resilience, and increasing public awareness of the local and global implications of climate change (for example through our Climate Futures Forum earlier this year (see http://www.victoria.ac.nz/climate-change/events/climate_futures_forum_presentations.html). In the next year we will be working with the School's Environmental Studies programme to enhance teaching at both undergraduate and post-graduate levels that offers advanced knowledge and skills relevant to climate change issues as they evolve.

GRADUATE ORIENTATION

An orientation will be held in the first week of Trimester 1 for all students taking graduate courses administered by the School and its associated Boards of Studies. Students are advised to participate in this orientation as key matters to do with accommodation, facilities and course organisation will be covered. It is also a valuable opportunity to meet other students and staff. You should direct enquiries on particular courses to the staff members cited in the course descriptions.

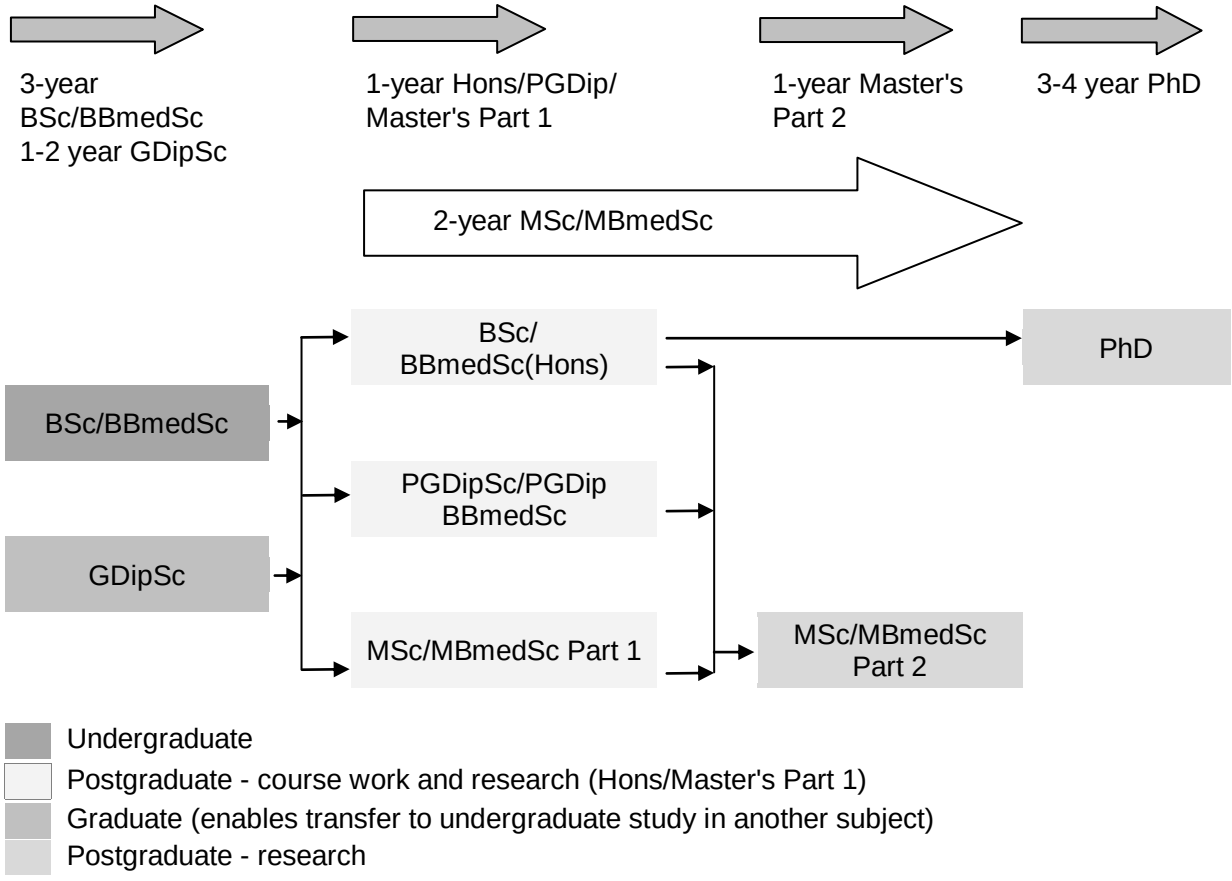
GRADUATE CO-ORDINATORS

If you are having problems at any stage during your graduate study, and you feel that you cannot approach your supervisor or a course coordinator – you can always approach one of the graduate co-ordinators. f you are part of any of the geography programmes you should see Dr Andrew Mackintosh for Physical Geography and Professor Phillip Morrison for Geography, while students in Geology or Geophysics programmes should see Professor Martha Savage.

Finally you can talk to the Head of School by making an appointment with Susan Cayless, the Manager (School Administration).

POSTGRADUATE STUDY IN SCIENCE

The diagram below represents the structure of postgraduate study in science.



IMPORTANT DATES

Trimester 1 commences	5 Mar
Good Friday	6 Apr
Easter Monday	9 Apr
Mid trimester break	6 Apr – 22 Apr
Graduation	15 – 17 May
Queen's Birthday	4 Jun
Examinations	15 Jun – 4 Jul
Mid year break	5 Jul – 15 Jul
Trimester 2 commences	16 Jul
Mid trimester break	27 Aug – 9 Sep
Labour Day	22 Oct
Examinations	26 Oct – 17 Nov
Trimester 3 commences	19 Nov
Graduation	12 – 13 Dec

TIMETABLE

The timetable is online at www.victoria.ac.nz/timetables/

School of Geography, Environment and Earth Sciences
Te Kura Tātai Aro Whenua

Programme*:* Geography, Environmental Studies & Development Studies
Location*:* Cotton Building, Room 311
Phone*:* 04-463 6108
Fax*:* 04-463 5186
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Website*:* **www.victoria.ac.nz/sgees/**

STAFF CONTACTS

		ROOM	CONTACT
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Development Studies	Prof John Overton john.overton@vuw.ac.nz	209	Tel. 463 5281
Geography	Prof Warwick Murray Warwick.murray@vuw.ac.nz	211	Tel. 463 5029
Earth Sciences	Dr Julie Vry julie.vry@vuw.ac.nz	410	Tel. 463 6432
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Administrator	Mr Alan Ball Alan.ball@vuw.ac.nz	311	Tel. 463 5346
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Prof Diane Seward	diane.seward@vuw.ac.nz	513	Tel. 463 5814

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Technician – Geo-chem	TBA		
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Ms Ningsheng Wang	ningsheng.wang@vuw.ac.na Senior Technical Officer – Luminescence Lab Coordinator	414	Tel. 463 6127

Climate Change Research Institute

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Professor	Prof Peter Barrett		Tel. 463 6790
Professor	Prof Martin Manning		Tel. 463 5474
Administrator	Ms Liz Thomas		Tel. 463 5507

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Senior Research ellow	Dr Nancy Bertler	505b	Tel. 463 6196
Senior Research Fellow	Dr Melissa Bowen	511	Tel. 463 6836
Prof. of Marine Geology	Prof Lionel Carter	512	Tel. 463 6475
Senior Research Fellow	Dr Warren Dickinson	506	Tel. 463 6199
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Research Fellow	Dr Huw Horgan	505e	Tel. 463 9592
Field and Operations Engineer	Mr Darcy Mandeno	505d	Tel. 463 9662
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Projects Manager	Mr Alex Pyne	501	Tel. 463 5396
Research Fellow	Dr Dan Zwartz	505d	Tel. 463 5176

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Dr Greg Bodeker
Dr John Gamble
Dr Eric Martinot

Adjunct Associate Professor:
Simon Watts

Adjunct Research Associates
Dr Chris Clowes
A/Prof James Cramp
Dr Margaret Harper
Dr William Mclea
Dr Bruce Mountain
Dr Chris Hollis,
Dr Aline Holmes
Dr Michael Isaac
Ms Judy Lawrence
Dr Graham Leonard,
Dr Matthew Leybourne
Mr Ilias Pechlivanidis
Dr Carol Stewart,
Dr Marcus Vandergoes
Dr Elena V Volkova
Mr Richard Willis

Adjunct Lecturers
Mr Mark Schwarz,
Mr Chris Webster
Dr Cory Davis
Dr Devin Kilminster

Honorary Research Associates
Prof Michael Abramson
Dr Ershad Ali,
Dr Philip Barnes
Dr Stephen Bannister
Dr Greg Bignall
Dr Martin Bizzaro,
A/Prof Stuart Bradley
Dr Kate Clark
Dr Christopher Clowes
Dr Erica Crouch,

Dr Michael Crozier
Dr Sam Dean
Dr Judith Davey
Dr Susan Ellis
Dr Heide Friedrich
Dr David Kennedy
Dr Peter King
Dr Beate Leitner
Dr John McKinnon
Dr Bruce Mountain
Dr Ingo Pecher
Prof Adbul Ghani Md Rafek
Dr James Renwick
Dr Roderick Sewell
Dr Claire Sinclair
Dr Rupert Sutherland
Dr Andrew Weaver
Dr Sean Weaver
A/Prof Charles Williams
Dr Michael Williams
Ms Cath Wallace
Mr Richard Willis
Dr Richard Wysoczanski
Dr Marcus Vandergoes

QUALIFICATIONS IN GEOGRAPHY

Geography at Victoria in 2012 will include five themes and are detailed below and in Table 1.

EARTH SURFACE PROCESSES (SYSTEMATIC PHYSICAL GEOGRAPHY)

Hillslope and coastal geomorphology and processes as well as hydrology are among the sub-themes included here. There is a particularly strong focus on landscape stability, an important issue for resource managers in New Zealand, as well as the impact of changing climate on New Zealand and the World's landscapes.

ECONOMIC AND SOCIAL SYSTEMS

This theme includes several sub-themes, such as economic, urban, social, cultural and population geography. It focuses particularly on the processes of change in regional economies and human societies including urbanisation, industrial restructuring, social and economic development, and dimensions of place and identity.

DEVELOPMENT STUDIES

This programme aims to consider development from many perspectives. It is multi-disciplinary, providing an overview and electives from Political Science, Education, Tourism and Environment, for example. Students address the ways in which theory interfaces with practice. A strong emphasis on developments in the Pacific will allow students to monitor the new NZAid's policy focus on poverty.

ENVIRONMENTAL STUDIES

This theme focuses on the inter-relationships between the biophysical and built environments and the human activities which shape and affect them, both in New Zealand and at the global scale. Courses involve the study of policy, management processes, natural hazards, conservation management, Maori and indigenous issues, and resource law and economics. Throughout this programme the aim is to provide a sound understanding of how natural systems behave within the context of human use and how our institutions and management systems have developed and need to evolve to provide sustainable management of resources.

GEOGRAPHIC INFORMATION SCIENCE (GIS)

A distinctive feature of the undergraduate program is a strong GIS component delivered through courses GEOG 215 and GEOG 315, which can support research on all the above themes.

In all these areas, we are committed to providing a geographic understanding of contemporary developments and issues and the knowledge and skill base needed in an increasingly complex society.

Table 1: BA or MSc Honours and MSc Part 1

GEOG 404 Geography of Development Studies *Ms Kindon*	GEOG 406 Geography of Place, Power and Identity *Ms Kindon*	GEOG 410 Urban Studies *Prof Morrison*	GEOG 411 Special Topic (Human Geography) TBA	PHYG 413 Migration, Diasporas & Transnationalism Dr Alan Gamlen	
PHYG 414 Climate Change: Lessons from the Past Rewi Newnham	PHYG 415 Special Topic (Geographical Information Systems Science) Dr de Roiste	PHYG 416 *Special Topic B* *TBA*	PHYG 417 Hydrological Processes and Modelling *Dr Jackson*	PHYG 418 Geomorphology & its Applications *TBA*	
PHYG 419 Natural Hazards & Risk: Processes & impacts *TBA*	PHYG 420 Water Resources *Dr Jackson*	PHYG 423 Field Geomorphology *TBA*	GEOG 440 Directed Individual Study	GEOG 441 Directed Individual Study	
GEOG 489 Research Project *Prof Morrison*	PHYG 489 Research Project *Dr Mackintosh*	PHYG/GEOG 580 Research Preparation Dr Mackintosh			
Geog (Hons) and MSc Part One students in GEOG and PHYG may also take the following:					
ENVI 504 Environmental Economics and Public Policy *Ms Wallace*	ENVI 505 Maori Environmental and Resource Management Dr Hutchings	ENVI 522 Environmental Law *Mr Bennion*	ENVI 523 Planning & the RMA *Mr Bennion*	ENVI 526 Human Dimensions of Conservation	ENVI 527 The Politics of Environment and Development
ENVI 529 Special Topic: Sustainable Energy *Dr Eric Martinot*	ENVI 528 Climate Change Issues *A/Prof Chapman*	DEVE 511 Development Theory *Prof Overton*	DEVE 512 Development Practice *Dr Andrew McGregor*	DEVE 513 Development Policy *Prof Overton*	ENVI 520 Environmental Management *A/Prof Chapman*
Geog (Hons) and MSc Part One students in GEOG and PHYG may also take the following:					
GISC 401 Foundations of Geographic Information Science *Femke Reitsma* *University of Canterbury*	GISC 402 GIS Science Research *Femke Reitsma* *University of Canterbury*	GISC 403 Cartography and Geovisulisation Mairead de Roiste *University of Canterbury*	GISC 404 Geospatial Analysis *Gregory Breetzke* *University of Canterbury*	GISC 405 GIS Programming and Databases Cark Cerecke *University of Canterbury*	GISC 406 Remote Sensing for Earth Observation Wolfgang Rack *University of Canterbury*
GISC 411 Geographic Information Science in Health Amber Pearson *University of Canterbury*	GISC 412 Spatial Algorithms and Programming Feme Reitsma *University of Canterbury*	GISC 413 Special Topic: Geomatic Data Acquisition Techniques Kelvin Barnsdale *University of Canterbury*	GISN 415 GIS Internship Femke Reitsma *University of Canterbury*	GISC 416 Special Topic Femke Reitsma *University of Canterbury*	

CAREERS IN GEOGRAPHY

The employment opportunities for Geography graduates are extraordinary. The wide disciplinary base that a Geography major obtains at Victoria means graduates are in constant demand by employers, from government departments and ministries to private consultancies and agencies of the United Nations. This demand directly relates to the teaching and research philosophy within Geography which emphasises the links between theory, practice, research and policy to provide a holistic understanding of how the world behaves and operates.

It is because Geography covers a wide range of topics and disciplines that it is rare to see an advertisement specifically titled "Geographer". What you will find is that jobs advertised, such as Geographic Information Systems operator/analyst, policy analyst/researcher, risk and hazard manager, hydrologist, soil conservation officer, environmental manager are all aimed at people who are classed as geographers. Even people employed as geologists often have significant geographical knowledge which gains them the employment they want.

One of the largest employment opportunities that geographers have today is addressing and analysing the effects of climatic and environmental change. It is the ability of the geographer to integrate both the natural and human aspects of our environment that sets them apart from other disciplines. This is also reflected in the companies and agencies where our graduates have been employed in the past few years, such as:

- RS Consultants Ltd
- Tonkin & Taylor Ltd
- Opus Ltd
- Regional Councils in Wellington, Southland, Northland, Hawke's Bay, Manawatu, Auckland
- Ministry of Social Development
- Centre for Research Evaluation and Social Assessment
- Ministry of Foreign Affairs and Trade/NZAid
- Treasury
- Department of Conservation
- Parliamentary Commissioner for the Environment
- Climate Change Office
- GNS Science
- NIWA
- Most local government bodies
- Mighty River Power
- URS Ltd
- TradeNZ
- MAF

Employers regard the breadth of knowledge, the writing, numerical, computing and presentation skills of geographers from Victoria University as a great asset. One particular aspect of geographical training that is greatly valued is the field-based learning that is undertaken, from week long trips around the country to overnight stays on the University marae. As a geographer you are therefore encouraged to take a range of topics during your university degree.

GRADUATE PROGRAMMES

With Geography there are four programmes, each of which has a Postgraduate Advisor or Programme Director, as follows:

GEOG	Prof Warwick Murray, 463-5029 (Director)
GEOG	Phil Morrison 463 5645 (Postgraduate Co-ordinator)
PHYG	Dr Andrew Mackintosh (Postgraduate Co-ordinator)
GISC	Dr Mairead de Rosie 463 6431 (Postgraduate Advisor)
DEVE	Prof John Overton, 463-5281 (Director)
ENVI	A/Prof Ralph Chapman, 463-6153 (Director

The following graduate qualifications are offered:

Certificate in Science in all MSc Subjects

Postgraduate Diploma in Science in all MSc Subjects

BA or BSc with Honours in Geography, BSc with Honours in Physical Geography

MSc with Honours in Geography or Physical Geography (Parts 1 and 2)

MSc or MA by thesis in Geography, or in Physical Geography

PhD in Geography, Physical Geography, Environmental Studies, or Development Studies

Postgraduate Diploma (PGDipGIS) in Geographic Information Science

The Master (MGIS) Geographic Information Science

Postgraduate Diploma in Environmental Studies (PGDipEnvStud)

Master of Environmental Studies (MEnvStud)

Postgraduate Diploma in Development Studies (PGDipDevStud)

Master of Development Studies (MDevStud)

GDipSc (Geography, Physical Geography)

GDipArts (Geography, Development Studies)

If you are interested in applying for any one of these programmes of study, you should consult the University Calendar for details of entry requirements, and obtain a copy of the *School of Geography, Environment and Earth Sciences Graduate Student Handbook* from Administration (CO311). You should then talk with the relevant Programme Director (Prof

Warwick Murray) or the Graduate Co-ordinator for Geography (Prof Philip Morrison). See the separate prospectuses for postgraduate Environmental Studies and Development Studies for information on those Masters Degrees and PG Diplomas.

STAFF-STUDENT SEMINARS

Held weekly during the trimesters, all students are strongly encouraged to attend these research seminars. In addition to staff and student presentations a range of speakers from academia, the public service and other organisations in New Zealand and overseas will present and discuss their research.

GRADUATE REPRESENTATION

Each year, one student representative is nominated and/or elected to represent the graduate body at the Geography Programme staff meetings. This position is important for staff-student relationships and helps to ensure that perspectives and concerns are heard.

RESEARCH PREPARATION SERIES

All students enrolled in postgraduate programmes within Geography have an opportunity to participate in a series of seminars designed to foster good research practice.

Students enrolled in Master's of Development Studies and Master's of Environmental Studies programmes are required to enrol for DEVE 514 and ENVI 521 respectively, while students doing Part 1 of a Masters degree in Geography or Physical Geography are required to do GEOG 580 or PHYG 580. These courses are all co-taught and involve both lecture and workshop content; they are taught by a range of staff members, covering a variety of topics relevant to planning and conducting research. The research preparation courses run in the second trimester. They will in part be taught concurrently, but will also involve independent sessions that are specific to individual disciplines.

A similar programme of research preparation will be offered to Honours students (GEOG 489, PHYG 489) early in the first trimester.

BSc WITH HONOURS, OR MSc PART 1, POSTGRADUATE DIPLOMA

An average of a B+ grade in 300-level courses, or permission of the Programme Director (Professor Warwick Murray), is required for acceptance into Honours or MSc (Part 1).

The Masters programme is in two parts. Part 1 is similar to the Honours programme, except that PHYG 580 is required rather than PHYG 489.

Students wishing to enrol in either GEOG or PHYG Honours or Masters must inform the Geography Graduate Coordinator (Prof Philip Morrison- GEOG / Dr Andrew Mackintosh - PHYG) stating both their desire to enrol in Honours AND the names of faculty members approached regarding potential research projects. While approval to enrol in Honours may be granted until the 10 January students should have spoken to a number of possible supervisors and have signaled their intentions to either Prof Philip Morrison or Dr Andrew Mackintosh before the end of December the preceding year.

You are advised to select the courses you wish to take early and begin reading over the summer prior to enrolment. If you are intending to take GEOG 489 or PHYG 489 (research projects), you should identify a possible topic as soon as possible and begin background reading, thinking or fieldwork as advised by a member of staff. Sample the courses offered in the first two weeks and be ready to finalise which courses you will take by the end of the second week. It is advisable to consider the assessment and structure of each course, the timing of assignment deadlines and the overall complement of the subjects when making your decision

Full details regarding enrolment are found in the University's *Enrolment Guide*.

COURSES OFFERED

The Geography programme offers a range of courses at Honours and Masters Part 1 level. They are listed in Table 2.

Table 2: Honours and Postgraduate Courses offered under the Geography Programme

400-level courses offered for BA(Hons), BSc(Hons), Postgraduate Diploma in Science, MSc Part 1

Course	Title	Pts
ENVI 504	Environmental Economics and Public Policy	30
ENVI 505	Maori Environmental and Resource Management	30
ENVI 520	Environmental Management	15
ENVI 522	Environmental Law	15
ENVI 523	Planning and the RMA	15
ENVI 526	Human Dimensions of Conservation	15
ENVI 527	Conservation and Development	15
ENVI 528	Climate Change	15
ENVI 529	Special Topic: Sustainable Energy	15
GEOG 404	Geography of Development Studies	30
GEOG 406	Geography of Place, Power and Identity	30
GEOG 411	Special Topic: Human Geography	30
GEOG 410	Urban Studies	30
GEOG 413	Migration, diasporas & Tansnationalism	30
GEOG 440	Directed Individual Study	15
GEOG 489	Research Project	30
GISC 401	Foundations of Geographic Information Science	15
GISC 402	GISsience Research	15
GISC 403	Cartography and Geovisulisation	15

GISC 404	Geospatial Analysis	15
GISC 405	GIS Programming and Databases (University of Canterbury)	15
GISC 406	Remote Sensing for Earth Observation	15
GISC 411	Geographis Information Science in Health	15
GISC 412	Spatial Algorithms and Programming	15
GISC 413	Special Topic: Geomatic Data Acquisition Techniques	15
GISC 415	GIS Internship	15
GISC 416	Special Topic	15
PHYG 414	Climate Change: Lessons From the Past	15
PHYG 415	Geographical Information Systems Science	15
PHYG 416	Special Topic B	15
PHYG 417	Hydrological Processes and Modelling	15
PHYG 418	Geomorphology and its Application	15
PHYG 419	Natural Hazards and Risk: Processes and Impacts	15
PHYG 420	Water Resources	15
PHYG 423	Field Geomorphology	15
PHYG 489	Research Project	30
DEVE 511	Development Theory	15
DEVE 512	Development Practice	15
DEVE 513	Development Policy	15
DEVE 560	Special Topic	30

NOTES:

1. ENVI designates ENVIRONMENTAL STUDIES courses administered by the Board of Studies in Environmental Studies.
2. GEOG designates GEOGRAPHY courses administered by the Geography Board of Studies.
3. PHYG designates PHYSICAL GEOGRAPHY courses administered by the Geography Board of Studies.
4. DEVE designates DEVELOPMENT STUDIES courses administered by the Development Studies Board of Studies.

The Postgraduate Diploma in Science requires 120 points similar to Honours but does not require a project or research supervision.

The PG Certificate in Science requires 60 points similar to Honours but does not require a project or research supervision.

The BA or BSc with Honours requires 120 points. They should form a "coherent course of study" and at least 60 points must be from Table 2 including either GEOG 489 or PHYG 489. The other 60 points, while normally taken from Table 2, can be from other disciplines providing the overall course is approved by either of the Geography Graduate Co-ordinators (Prof Phil Morrison – Geography, and Dr Andrew Mackintosh – Physical Geography).

MSc Part 1 requires 90 points normally selected from Table 2 (excluding GEOG 489 and PHYG 489) plus GEOG 580 or PHYG 580 – Research Preparation. Full details of requirements are provided in the University Calendar.

COMPLETION

While it is desirable to complete an Honours degree within the year, it is possible to study for the BA Honours degree part-time over a maximum of four years, providing permission of the Graduate Co-ordinator is obtained and the overall programme is approved. BSc with Honours may be completed over two years, with permission of the Graduate Co-ordinator and programme approval.

The **Postgraduate Diploma in Science** is a postgraduate science qualification offered in all subjects offered for the MSc. It will appeal to students wanting a post-graduate course-work qualification as a research project is not compulsory. The PGDipSc also provides an opportunity for those students who are not able to meet the entry requirements for the BSc (Hons) or MSc part 1. The PGDipSc requires 120 points of post-graduate study and can be completed full-time in 2 trimesters or part-time over 4 years.

*Students are encouraged to applyl online at www.victoria.ac.nz/home/admis**enrol/** but enrolment forms will be available from the Student Recruitment and Course Advice Office.

Postgraduate Certificate in Science The Postgraduate Certificate in Science is a new postgraduate science qualification and will be offered in all MSc subjects. It will appeal to students seeking a postgraduate course-work qualification as a research project is not required. The PG Certificate also provides an opportunity for those students who are not able to meet the entry requirements for the BSc (Hons) or MSc 1. The PG Certificate in Science requires 60 points of postgraduate study and can be completed in one trimester or part time over two years.

MSc PART 2 AND PhD

Part 2 requires submission of a 120 point thesis. The degree can be awarded with a class of Honours.

Study at Master of Science Part 2, and PhD levels is entirely by thesis research. No coursework is required but students may be invited to sit in on courses that would aid their studies. Full details are provided in the University Calendar and students are invited to discuss their research interests with members of staff.

Applicants for the Master of Development Studies or the Master of Environmental Studies should consult the specific prospectuses.

POSTGRADUATE CERTIFICATE IN SCIENCE

The Postgraduate Certificate in Science is a new postgraduate science qualification and will be offered in all MSc subjects. It will appeal to students seeking a postgraduate course-work qualification as a research project is not required. The PG Certificate also provides an opportunity for those students who are not able to meet the entry requirements for the BSc (Hons) or MSc 1. The PG Certificate in Science requires 60 points of postgraduate study and can be completed in one trimester or part time over two years.

The PG Certificate in Science requires 60 points similar to Honours but does not require a project or research supervision.

POSTGRADUATE DIPLOMA IN SCIENCE (GEOGRAPHY)

The Postgraduate Diploma in Science (Geography) is a qualification available to science graduates in Geography. The Postgraduate Diploma requires the completion of 120 points of postgraduate approved 400/500-level courses of which 60 points must come from the above list. The Postgraduate Diploma in Science requires 120 points similar to Honours but does not require a project or research supervision.

QUALIFICATIONS IN GEOGRAPHICAL INFORMATION SCIENCE

The Master (MGIS) and Postgraduate Diploma (PGDipGIS) in Geographic Information Science (GIS) are new programmes starting in 2012 (subject to CUAP approval). The programmes are run at both Victoria University of Wellington and the University of Canterbury. Students can register at either institution and access the GISC courses taught at either location as well relevant local electives.

The MGIS is the only one of its kind in New Zealand and is a nationally and internationally relevant qualification. We give students a choice of graduate courses with the goal of meeting employment vacancies within the Spatial Information Industry in New Zealand and internationally. This programme also equips students with research skills and will enable students to progress to a PhD in GIS.

The programme will be very relevant to recent graduates, and to those already in the work force wishing to up-skill their knowledge and expertise in GIS.

Study at Victoria University has the advantage of being in Wellington, New Zealand's capital city.

As well as having excellent research capability in GIS between Canterbury and Victoria, other New Zealand and international GIS colleagues, Land Information New Zealand (LINZ) and other allied agencies are also involved in the delivery and research support of this programme.

CAREERS

Consultation with other agencies has demonstrated very convincingly that there is a need for graduates with an MGIS or PGDipGIS. There is currently a shortage of skilled graduates to move into geospatial roles within New Zealand and internationally. There is also a need to expand and improve the skills of existing geospatial employees.

Graduates from the programme will be qualified to work as GIS professionals in research, government and industry and will gain a range of skills (both transferable and specialised) which will equip them for employment or research in a range of cognate disciplines or within the arena of GIS specifically.

GIS is an area of increasing interest for Māori as well. GIS has been used by some roopū to assist their contemporary Maori development opportunities, has supported and recorded complex textual and oral evidence for the Waitangi Tribunal, and has also been used to assist negotiation and empowerment at both central and local government level.

MASTERS OF GEOGRAPICAL INFORMATION SCIENCE*

This degree provides an interdisciplinary approach to Geographic Information Science, including taught courses and supervised research. Graduates will have advanced knowledge in the field, with the ability to study independently; carry out original research; and plan, execute and present the finding of applied GIS projects. The Masters of Geographic Information Science (MGIS) will comprise of 240 points. The first year of the programme will consist of compulsory and elective courses which will cover the GIS foundations, theory, research methodology, data collection and processing analysis, and presentations. The second year (Part 2) will involved the completion of a 120 point thesis. The MGIS (Part 1 + Part 2) should normally be completed within 2 years and six months of enrolling or up to five years if a student is studying part time.

Part 1

I. GISC 401-404
II. One or more courses from GISC 405-416
III. The Director of the Joint Board of Studies (JBS) may approve a substitution for up to 15 points to be taken as local electives.
IV. i-iii Must total to the mandatory 120 points

Part 2: Thesis GISC 591

ENTRY REQUIREMENTS

Entry to Part 2 requires the acceptance of a thesis proposal by the JBS and either a B+ average from Part 1 courses or special permission from the Director of the Joint Board of Studies.

POSTGRADUATE DIPLOMA IN GIS*

The postgraduate diploma in GIS (PGDipGIS) provides an interdisciplinary approach to Geographic Information Science. Graduates will have advanced knowledge in the field, with the ability to study independently and plan, execute and present the findings of applied GIS projects. The PGDipGIS will consist of 120 points. The programme will consist of compulsory and elective courses which will cover the GIS foundations, theory, research methodology, data collection and processing analysis, and presentations.

i. GISC 401-404
ii. One or both courses from GISC 405-406
iii. One or more courses from GISC 410-416
iv. Further points from the MGIS Schedule to complete the mandatory 120 points
v. The Director of the Joint Board of Studies (JBS) may approve a substitution for up to 30 points to be taken as local electives from (iii) and (iv) of Part 1.

* *subject to approval*

ENTRY REQUIREMENTS

The candidate for an MGIS or PGDipGIS needs to have completed a Bachelor's degree, two undergraduate GIS courses and be accepted by the Director of the Joint board of Studies as being capable of proceeding with the course.

QUALIFICATIONS IN PHYSICAL GEOGRAPHY

Physical geography is the study of the Earth's surface features and processes. It aims to explain the geographic pattern of landforms, soils, vegetation, hydrology, coasts, and climate by understanding the processes operating at the surface of the Earth. Whereas the physical processes involved link the discipline closely to other Earth Sciences, the dependence of human activity on physical resources and human impact on the environment also link the subject to geography.

Although there are a number of departments of Physical Geography throughout the world, Victoria University is the only institution in New Zealand offering a degree specifically in Physical Geography. The School of Geography, Environment and Earth Sciences has provided a unique environment in which to develop teaching and research in the subject by sharing staff and resources with geology, geophysics, human geography, environmental studies and development studies.

General information on physical geography programmes can be obtained from Dr Andrew Macintosh (Graduate Co-ordinator for Physical Geography) or Prof Warwick Murray (Geography Programme Director).

COURSE PLANNING

There are three tracks leading from undergraduate to postgraduate research in Physical Geography

TRACKS	1	2	3
Level 1	BA / BSc	BA / BSc	BA /BSc
Level 2	BSc(Hons)	BSc(Hons)	MSc Pt 1
Level 3	MSc Part 2		MSc Pt 2
Level 4	PhD	PhD	PhD

On all five tracks the attainment of each particular level requires approximately the same amount of time, although options for part-time study are available.

Students wishing to undertake postgraduate studies in Physical Geography normally enrol for a BSc(Hons) degree or for MSc Part 1. To be eligible they must have completed a Bachelors degree, which included 36 300-level points in a physical geography course and 24 300-level points from any other science course, or 48 300-level approved points in geography. Normally an average of a B+ grade in 300-level courses, or permission of the Programme Director (Professor Warwick Murray), is required. The Head of School (A/Prof

Hannah) may also approve entry of other candidates who show evidence of adequate training and academic merit.

The Honours degree in Physical Geography requires PHYG 489 (Research Project) plus as least 30 points from the below list. The research project (PHYG 489) is compulsory.

PHYG 414	Climate Change: Lessons from the Past	15 pts
PHYG 415	Introduction to Geographic Information Science and Systems (GIS)	15 pts
PHYG 416	Special Topic B	15 pts
PHYG 417	Hydrological Processes and Modelling	15 pts
PHYG 418	Geomorphology and its Application	15 pts
PHYG 420	Water Resources	15 pts
PHYG 419	Natural Hazards and Risk: Processes and Impacts	15 pts
PHYG 423	Field Geomorphology	15 pts
PHYG 440	Directed Individual Study	15 pts
GISC 405	GIS Programming and Databases	15 pts
PHYG 489	Research Project	30 pts
ESCI 403	Stratigraphy and Palaeontology	15 pts
ESCI 412	Quaternary Stratigraphy	15 pts
PHYG 580	Research Methods	15 pts

PHYSICAL GEOGRAPHY FOR MSc

The Masters programme is in two parts. Part 1 is similar to the Honours programme, except that PHYG 580 is required rather than PHYG 489. Part 2 requires submission of a 120 point thesis. The degree is awarded with a class of Honours.

Alternatively a candidate who has been admitted to the degree BSc with Honours may be awarded the degree of MSc on presenting a satisfactory thesis. No courses are involved. If the thesis is of sufficient quality the degree may be awarded "with merit" or "with distinction".

PHYSICAL GEOGRAPHY FOR PhD

Candidates seeking admission to this course should consult the Course Statute for the Degree of Doctor of Philosophy in the VUW Calendar, or consult the PhD Handbook: www.vuw.ac.nz/home/subjects_degrees/pg_degrees.html#phd

POSTGRADUATE CERTIFICATE IN SCIENCE

The Postgraduate Certificate in Science is offered in all MSc subjects. It may appeal to students seeking a postgraduate course-work qualification as a research project is not required. The PG Certificate also provides an opportunity for those students who are not able to meet the entry requirements for the BSc (Hons) or MSc 1. The PG Certificate in Science requires 60 points of postgraduate study and can be completed in one trimester or part time over two years.

POSTGRADUATE DIPLOMA IN SCIENCE (PHYSICAL GEOGRAPHY)

The Postgraduate Diploma in Science (Physical Geography) is a qualification available to science graduates in Geography. The Postgraduate Diploma requires the completion of 120 points of postgraduate approved 400/500-level courses of which 60 points must come from the above list. This is a good programme that allows you to specialise in areas such as hydrology or to upgrade your knowledge.

Contact the Geography Programme Director, Prof Warwick Murray
warwick.murray@vuw.ac.nz; Tel: 463 5029.

CAREERS IN PHYS GEOG

There is currently exceptionally strong demand for graduates in physical geography. Many of our graduates occupy roles in resource management, land management and planning. Others are engaged in aspects of environmental monitoring, resource surveys, impact assessment. Physical geography graduates are employed in many agencies of central government, including Crown Research Institutes, (e.g. GNS, NIWA) for the Ministry for the Environment, Department of Conservation, Ministry of Civil Defence, Ministry of Energy, Ministry of Agriculture, as well as catchment boards, regional and district planning authorities and private consultancies (e.g. Tonkin & Taylor, URS Ltd, Opus).

DOCTOR OF PHILOSOPHY IN GEOGRAPHY OR PHYSICAL GEOGRAPHY

The PhD is the highest degree awarded by the University for research work. PhDs are awarded on the examination of a thesis, evaluated using international standards.

- The Faculty of Graduate Research (FGR) provides a first port of call for all students interested in enrolling in a PhD at Victoria. The Faculty website http://www.victoria.ac.nz/phd provides application forms, details of available funding, application dates, and answers to a host of questions. The FGR continues to provide support to PhD students throughout their studies at Victoria.

- There will be three deadlines for all PhD applications to be considered. The dates are 1 March, 1 July and 1 November. Students may complete an application form and speak with prospective supervisors prior to the deadline, but their application must be submitted through the FGR and formal acceptance into the programme will be made after the deadline.

QUALIFICATIONS IN GEOLOGY

Geology is the study of the physical processes and history of the Earth. The science seeks an understanding of such diverse and important phenomena as Earth's internal structure, plate tectonics, earthquakes, mountain building, volcanic eruptions, the origin and evolution of life, the extinction of the dinosaurs, the formation of sedimentary basins, climate and sea level change, glaciation, and landscape evolution. Also included are the origin and conservation of the Earth's natural resources, such as minerals, fossil fuels, soils and water.

Nowhere on Earth are active geological processes more obvious and accessible than in New Zealand. Wellington, the capital city of New Zealand, sits beside a spectacular harbour between two active faults on a major plate boundary. The city is located in a tectonically active landscape where the southern tip of the North Island enters Cook Strait, within view of the South Island's snow-covered Kaikoura Ranges. It is only a few hours drive from the North Island's active volcanoes, and a ferry ride away from Marlborough Sounds and the South Island. As a natural laboratory in which to study earth movements, faulting, earthquakes, landscape development, and many other active geological processes, the Wellington region is justifiably famous internationally. Wellington is also the hub of Earth Science Research in New Zealand, as this city is the home of the GNS Science, Te Papa Tongarewa (New Zealand's national museum), and the National Institute of Water and Atmospheric Research (NIWA).

Teaching and research in Geology at Victoria University take advantage of Wellington's dynamic setting, its association with Victoria's Institute of Geophysics, and its long and continuing tradition of Antarctic Research. VUW's geology group is internationally respected for its recent contributions to such fields as past climate change in NZ and Antarctica, volcanology, tectonics and origin of our solar system.

In the modern world, understanding of geological processes is becoming increasingly important for those concerned with the extraction and preservation of the Earth's natural resources, the evaluation of natural hazards, anticipating the social and environmental effects of global change, and undertaking environmental and resource planning and monitoring.

Geology has direct relevance for students majoring in not only Geology, Geophysics and Physical Geography but also Architecture, Biology, Chemistry, Ecology, Environmental Studies, Geography, and Physics.

CAREERS

The multidisciplinary nature of a degree in Geology is a valuable asset. Geology training includes fieldwork and integrates material from areas as diverse as physics, mathematics, chemistry and biological sciences, guaranteeing that the Geology graduate has wide-ranging skills across a broad area of science, and competency in the outdoors. Add to this a postgraduate research project and you will develop skills in independent research, including field studies, modern surveying techniques (including the Global Positioning System), design and use of computer programs and databases, public speaking, computer drafting and graphical presentation, use of the internet, Geographic Information Systems (GIS), and desktop publishing.

Most students and practicing geologists find the combination of field with laboratory work stimulating and rewarding. The interdisciplinary nature of Geology means that graduates have a broad choice of future careers. These include work in fields of mineral and petroleum exploration, advanced research at Crown Research Institutes and Universities, resource management, environmental management and protection. Still others choose to use their training in other ways by moving into teaching, banking, real estate, law, the stock market IT, the tourist industries.

GRADUATE ADMISSION

There are no specific restrictions to graduate admission other than those set out in the University Calendar. In general, entry into the B.Sc. (Hons.) degree will be limited to students who have achieved an A grade in two 300-level year ESCI courses that form part of the Geology or Geophysics B.Sc. majors. A student is generally expected to have a B+ average or better to be a candidate for MSc programme in Geology, which is the favoured postgraduate degree programme for students intending to embark on postgraduate work in Earth Sciences at VUW after their BSc. All entries are subject to approval by the Convenor of Geology/Earth Sciences Board of Studies; a recommendation by a potential project supervisor is also required.

Table 2: Postgraduate courses

Group 1: Paleoenvironments, paleoclimate and paleoceanography.

ESCI 403 Stratigraphy & Paleontology *Prof Barrett*	ESCI 412 Paleoclimatology *Dr Dunbar*

Group 2: Tectonics and Structural Geology

ESCI 406 Petroleum Geology *A/Prof John Collen*	ESCI 407 Global Tectonics *A/Prof John Townend and A/Prof Tim Little*

Group 3: Solid Earth Geophysics

ESCI 411 Advanced Exploration Geophysics	GPHS 441 Origin and Evolution of the Earth and Planets *Prof Euan Smith*	GPHS 445 Observational Earthquake Seismology *Prof Martha Savage*
GPHS 446 Advanced Seismology *Prof Euan Smith*	GPHS 447 Geomagnetism *Dr Malcolm Ingham*	

Group 4 Geochemistry, Geochronology, Volcanology and Petrology

ESCI 413 Geochemical forensics of Earth's origins, history and future *Prof Joel Baker*	ESCI 414 Physics and Chemistry of Volcanoes *Prof Colin Wilson*	ESCI 416 Metamorphic Petrology *Dr Julie Vry*

Group 5 Special topics and research preparation

ESCI 404 Topics in Earth Sciences *Dr Warren Dickinson*	ESCI 408 Special Topics Programme Director	ESCI 441 Individual Directed Study Programme Director
GEOG 580 Research Preparation Prof *Euan Smith*	GPHS 580 *Research Prep*aration *Prof Euan Smith*	PGEO 580 Research Preparation *Prof Euan Smith*

BSC HONOURS GEOLOGY

MSc IN GEOLOGY

Part 1: GEOL 580 plus 7 other approved courses (***not*** PGEO 511), including at least 60 points from course groups 1 – 4 above. With the approval of the programme director up to 30 points of appropriate 400 level courses from the Science Faculty can be included in the programme of study (e.g., CHEM, BIOL, MATH, PHYG & PHYS).

Part 2: GEOL 591

MSc IN PETROLEUM GEOSCIENCE

Part 1: PGEO 401, PGEO 511, PGEO 580, ESCI 403, ESCI 406, ESCI 407, ESCI 411 plus 15 approved points.

Part 2: PGEO 591

Note *that there will be no automatic transition from Masters Part 1 to Part 2. Students will require a grade average of B+ in their Part 1 papers. Students with a lower grade average will need to discuss their options with the programme director and they may be redirected into a suitable postgraduate diploma.*

POSTGRADUATE DIPLOMA IN SCIENCE (GEOLOGY)

The Postgraduate Diploma in Science (Geology) is also available to science graduates in Geography. The requirement is 120 points from ESCI 401-489, GEOL 580, PGEO 401.

The **Graduate Diploma in Science (Geology)** shall consist of courses worth at least 120 points above 100-level from the BSc schedule including at least 75 points at 300-level. Up to 30 points may be replaced by approved courses from other programmes offered at this University. The candidate's course of study must meet the 300-level requirements of a major in Geology.

POSTGRADUATE CERTIFICATE IN SCIENCE

The Postgraduate Certificate in Science is a new postgraduate science qualification and will be offered in all MSc subjects. It will appeal to students seeking a postgraduate course-work qualification as a research project is not required. The PG Certificate also provides an opportunity for those students who are not able to meet the entry requirements for the BSc (Hons) or MSc 1. The PG Certificate in Science requires 60 points of postgraduate study and can be completed in one trimester or part time over two years.

DOCTOR OF PHILOSOPHY IN GEOLOGY OR GEOPHYSICS

The PhD is the highest degree awarded by the University for research work. PhDs are awarded on the examination of a thesis, evaluated using international standards.

- The Faculty of Graduate Research (FGR) provides a first port of call for all students interested in enrolling in a PhD at Victoria. The Faculty website http://www.victoria.ac.nz/phd provides application forms, details of available funding, application dates, and answers to a host of questions. The FGR continues to provide support to PhD students throughout their studies at Victoria.

- There will be three deadlines for all PhD applications to be considered. The dates are 1 March, 1 July and 1 November. Students may complete an application form and speak with prospective supervisors prior to the deadline, but their application must be submitted through the FGR and formal acceptance into the programme will be made after the deadline.

QUALIFICATIONS IN GEOPHYSICS

The School offers two themes in Geophysics: Solid Earth Geophysics and Meteorology. All graduate programmes include a research project. Students interested in a Geophysics programme at Victoria should select a research topic in consultation with the staff who will supervise the project, and who will offer suggestions about possible project topics.

Particular research interests and strengths include meteorology, geomagnetism and palaeomagnetism, seismology including volcano seismology, fault mechanics and seismic hazard assessment, tectonics, anisotropy and lithospheric structure. These strengths are maintained through vigorous programmes of research, including research by graduate students in New Zealand and Antarctica.

Teaching and research are endorsed by close collaboration with the New Zealand Meteorology Services and the Crown Research Institutes NIWA and GNS Science.

LOCATION

Geophysics facilities are mostly located on the 5th floor of the Cotton Building. For enquiries, telephone 463-6422 or write to Professor Euan G.C. Smith, School of Geography, Environment and Earth Sciences, Victoria University of Wellington, PO Box 600, Wellington (e-mail: euan.smith@vuw.ac.nz).

UNDERGRADUATE COURSES AND PREPARATION FOR GRADUATE STUDIES IN GEOPHYSICS

A prerequisite for enrolment for Honours or MSc in Geophysics is a Bachelor's degree including at least 48 points at 300-level in Mathematics and Physics or Geology, or a combination of these. A suitable level of preparation in mathematics is essential. The undergraduate programme can be planned in such a way as to lead logically to a programme of study in Geophysics, which places emphasis on any one of a number of broad areas. The undergraduate BSc Major in Geophysics is ideal preparation for graduate studies in Geophysics, but other undergraduate programmes can provide suitable preparation as well. For further information, see the School's undergraduate prospectus for Geophysics, or the VUW Calendar or Course Catalogue.

ESCI 407 Techonics *A/Prof John Townend and A/ProfTim Little*	ESCI 411 Solid Earth Geophysics *TBA*	ESCI /441 Individual Directed Study Programme Director	GPHS 441 Origin and Evolution of the Earth and Planets *Prof Euan Smith*
GPHS 445 Observational Earthquake Seismology *Prof Martha Savage*	GPHS 446 Advanced Seismology *Prof Euan Smith*	GPHS 447 Geomagnetism *Dr Malcolm Ingham*	GPHS 580 Research Preparation *Prof Euan Smith*

GPHS 489 Research Project 30 points Full year	GPHS 420 Intro to Dynamical Meteorology 15 points	GPHS 421 Mid-latitude Weather Systems 15 points	GPHS 422 Radiation and Thermodynamics for Meteorology 15 points
GPHS 423 Cloud Physics and Boundary Layer Meteorology 15 points	GPHS 424 Satellite Meteorology 15 points	GPHS 430, 431 Special Topics 15 points each	GPHS 425 Numerical Weather Prediction 15 points

METEOROLOGY

See Dr Jim McGregor for all courses.

SOLID EARTH GEOPHYSICS BSc HONOURS

GPHS 489; GPHS 441, 445 and GPHS 447 plus 45 approved points from 400 level GPHS and ESCI courses. With the approval of the programme director these may include appropriate MATH/PHYS 400 level courses**.**

MSc IN GEOPHYSICS

Part 1: GPHS 580, GPHS 441,445 and 447 plus 60 approved points from 400 level GPHS and ESCI courses. With the approval of the programme director these may include appropriate MATH/PHYS 400 level courses.

Part 2: GPHS 591

Note that there is no automatic transition from Masters Part 1 to Part 2. Students will require a grade average of B+ in their Part 1 papers. Students with a lower grade average will need to discuss their options with the programme director and they may be redirected into a suitable postgraduate diploma.

POSTGRADUATE DIPLOMA IN SCIENCE (GEOPHYSICS)

The Postgraduate Diploma in Science (Geophysics) is available to science graduates in a suitable discipline. The programme consists of 120 points of postgraduate course work and does not require a project. At least 60 points are required in Geophysics.

Contact Prof Euan Smith (463 6422), Euan.Smith@vuw.ac.nz, for further information.

Postgraduate Certificate in Science: The Postgraduate Certificate in Science is a new postgraduate science qualification and will be offered in all MSc subjects. It will appeal to students seeking a postgraduate course-work qualification as a research project is not required. The PG Certificate also provides an opportunity for those students who are not able to meet the entry requirements for the BSc (Hons) or MSc 1. The PG Certificate in Science requires 60 points of postgraduate study and can be completed in one trimester or part time over two years.

POSTGRADUATE DIPLOMA IN METEOROLOGY

The Postgraduate Diploma in Meteorology is available to science graduates. The programme comprises at least 120 points including: GPHS 489, 75 points taken from GPHS 420-425, and a further 15 points from GPHS 420-431 or a course approved by the Head of School. Prerequisites may apply for some courses.

Contact Dr Jim McGregor (463 5278), Jim.McGregor@vuw.ac.nz, for further information.

POSTGRADUATE CERTIFICATE IN METEOROLOGY

The Postgraduate Certificate in Meteorology is available to science graduates. Every personal course of study for the Postgraduate Certificate in Meteorology shall consist of four courses selected from GPHS 420-425. Prerequisites may apply for some courses.

Contact Dr Jim McGregor (463 5278), Jim.McGregor@vuw.ac.nz, for further information.

PLANNING A PROGRAMME

Select your programme from the following 400 and 500 level courses.

COURSE INFORMATION INDEX

Course code	Course reference number	Title		Trimester
↓	↓	↓		↓
GEOG 410	**CRN 1691**	**URBAN STUDIES**	**30 POINTS**	**[2/3]**

GEOGRAPHY COURSES

GEOG 404	**CRN 1679**	**GEOGRAPHY OF DEVELOPMENT STUDIES**	**30 POINTS**	**[1/3]**

Coordinator: Ms Sara Kindon

Assessment: 100% internal assessment involving a mix of individual assignments and team based work

Set Texts: Book of Course Readings – available from student notes
Kindon, S. Pain, R. and M. Kesby (eds) 2007 *Participatory Action Research Approaches and Methods: Connecting People, Participation and Place*, Routledge, London

Recommended Reading: Cooke, B. and U. Kothari (eds) 2001 *Participation: The New Tyranny?* Zed Books, London Ansell N 2005 *Children, Youth and Development*, Routledge, London

Over the last 20 years, development (at least in theory) has become increasingly 'participatory'. Yet participation, like development, can be interpreted and practised in many different ways with different effects. This course examines theories and practices of participatory development, especially as they relate to working with young people from refugee-backgrounds. It questions the uses and abuses of participation in different places through reflection on applied practice. It encourages students to think about participation geographically by paying attention to the role of place, space and power within this form of development practice.

The course is taught through student involvement in applied participatory development research and action projects with refugee-background young people. Students should expect to spend as much time working outside of the classroom as in it. Within class, sessions involve a mix of seminar presentations by academic and development consultants/practitioners; analysis and discussion of key papers, videos and other texts; workshops involving hands-on practice with participatory techniques; and feedback and evaluation sessions designed to integrate theory with practice.

GEOG 406	CRN 1685	GEOGRAPHY OF PLACE, POWER AND IDENTITY	30 POINTS	[1/3]

Coordinator:	Ms Sara Kindon
Assessment:	Written Engagement 10%; Field Paper 20%; Seminar Facilitation 25%; Research Paper 25%; Participation and Peer Assessment 20%
Set Texts:	Book of Course Readings – available from student notes
Recommended Reading:	Banivanua-Mar Tracey and Penelope Edwards (eds) 2010 *Making Settler-Colonial Space: Race, Place and Identity*, Palgrave-Macmillan, New York. Cresswell, Tim 2006 *Place: A Short Introduction*, Blackwell, Malden. Massey, Doreen 2005 *For space*, Sage, London.

In GEOG 406 we investigate what some commentators over the last 20 years have called, the ‘crises of place and identity’ generated by modernity and global capitalism. We explore the re-presentations, negotiationsand contestations over places and identities at various scales.

At the heart of the course are three recurring questions:

- How are the geographic (re)workings of power manifesting themselves in new understandings of places and identities?
- How are these places and identities being politicised? and
- Who benefits or loses out as a result of this politicisation?

To carry out the above explorations and questions, we engage different theoretical frameworks (feminist, poststructuralist and postcolonial) and work through fieldwork, discussion and student-led fieldtrips/seminars to ‘ground’ and experience the ideas explored. We also consider their implications for how geographers can contribute to more progressive understandings of place and contribute to social justice.

GEOG 410 CRN 1691 URBAN STUDIES 30 POINTS [2/3]

Coordinator: Prof Philip Morrison

Assessment: Survey applications review 20%; Application of method 30%; Short research project including literature review 20%. An analysis of a specific topic using an appropriate survey 30%.

Recommended Reading: Easterlin, R.A. 1973: Does money buy happiness? *Public Interest* 3, 3-10.Ferrer-i-Carbonell, A. and Gowdy, J.M. 2007: Environmental degradation and happiness. *Ecological Economics* 60, 509-516.Frey, B.S. and Stutzer, A. 2002: *Happiness and economics: how the economy and institutions affect human well being*. Princeton: Princeton University Press. Inglehart, R., Roa, R., Peterson, C. and Weltzel, C. 2008: Development, freedom, and rising happiness: A global perspective (1981-2007). *Perspective on psychological science* 3, 264-285.
Lane, R.E. 2000: *The loss of happiness in market economies*. New Haven and London: Yale University Press. Layard, R. 2005: *Happiness: lessons from a new science*. New York and London: Penguin.
Morrison, P.S. 2010: Local expressions of subjective well-being: the New Zealand experience. *Regional Studies* August (iFirst), 1-20.

This course is designed to introduce graduate students in Human Geography, Development Studies and Environmental Studies as well as other social science disciplines to the analysis of individual responses to questions on a wide range of social indicators covering social behaviour, attitudes and values in mainly urban environments. Topics of special interest in 2011 will be those to do with subjective well-being - responses to questions on happiness, satisfaction, quality of life. The focus will be on the way such responses by different demographic and social groups vary across a range of different environments.

Surveys used in class will range from the large, repeated international instruments such as the World Values Survey www.worldvaluessurvey.org/ through to the local New Zealand Quality of Life Surveys www.bigcities.govt.nz/

Students may suggest other large surveys they have access to including those on specific world regions such as Europe (Eurobarometer) www.columbia.edu/cu/lweb/indiv/dssc/eds/eurobarometer.html Increasingly surveys conducted in other regions are available for analysts to download, such as Latinobarometer and East Asian Barometer.

This course is primarily designed for students who require access to a much larger set of respondents than they would normally be able to collect themselves. These in turn may be complemented in thesis work the following year which may include qualitative small group research as taught in other courses. The aim is to help prepare students for the quantitative skills required in mixed methods research.

Some acquaintance with data analysis and elementary statistics would be an advantage but is not a prerequisite. The basics of the statistical package STATA will be taught with emphasis on practical applications of common techniques of analysis. The software will be supplied to be run on the students own laptops. The course will be limited to 10 students.

GEOG 411 CRN 1679 SPECIAL TOPIC: HUMAN GEOGRAPHY 30 POINTS [1/3]

Coordinator: TBA

This course explores advanced topics in Human Geography.

GEOG 413 CRN TBA MIGRATION, DIASPORAS & TRANSNATIONALISM 30 POINTS [2/3]

Coordinator: Dr. Alan Gamlen
Delivery: 3-4 contact hours per week (three weekly sessions, including tutes / labs, seminars, and guest speakers from government, NGOs and academia).
Assessment: Lab work and tutorials: 30%
Proposal (1,500 words): 15%
Seminar based on proposal (15 minutes): 15%
Extended essay based on proposal and lab work (5,000 words): 40%

The world is being transformed by cross-border links, forged by migrants and their descendants. Some of these linkages are temporary in nature, sustained by frequent mobility, while others are more durable, and are maintained by constant communication over long distances, facilitated by new technologies. Still others are older than the map of nation-states that has since been superimposed over geographically dispersed ethnic, religious and political groups. Whether old or new, these linkages have profound implications for how we understand, explain and manage the modern world.

This course introduces advanced students to academic and policy debates related to the formation of diasporas and transnational communities through the cross-border links that arise from migration. The course develops knowledge and skills from across the interdisciplinary field of human geography, and helps prepare students for academic and/or policy-relevant research. The course expands on themes and issues introduced in 300-level in human geography papers, and is also relevant to students from a wider range of social science backgrounds including economics, sociology, anthropology, and political science.

GEOG 440 CRN TBA DIRECTED INDIVIDUAL STUDY 15 POINTS

Prerequisite: Permission of the Head of School

A supervised programme of study approved by the Head of School. For more information please contact the Graduate Co-ordinator.

GEOG 489 CRN 10020 RESEARCH PROJECT 30 POINTS [1+2/3]

Coordinator:	Prof Philip Morrison
Timetable:	Your individual timetable for this course is flexible. However, you are recommended to allocate the following times to research related activities: · Regular supervision meetings with your supervisor; · Two hours per week of seminar and discussion in GEOG 580 (2/3 only).
Assessment:	You are required to submit work regularly towards your research project. Assessment is based on the final paper/report produced
Set Texts:	Previous Geography Honours Projects (contact Sandra Fogliani, Information Services - Administrator); SGEES Graduate Student Handbook (available from Reception, Room CO 311); Robinson, Guy 1998 *Methods and Techniques in Human Geography*; Flowerdew, R. and D. Martin (2005) *Methods in Human Geography*, Pearson/Prentice Hall, Harlow. Hay, I. (edn) (2005) *Qualitative Research Methods in Human Geography*, Oxford University Press, Melbourne

All students enrolled in a BA or BSc with Honours in Geography must take GEOG 489 and attend GEOG 580, Research Methods. GEOG 489 provides you with the opportunity and forum to design and carry out an independent research project on a topic of your choice under the guidance of a supervisor. It involves training support in research design, approach and methods through GEOG 580 Research Methods, the GED (Geography, Environment and Development) Research seminars, and in one-on-one sessions with a supervisor. You will need to discuss a possible topic with a staff member prior to enrolling in February. The sooner you can narrow down your focus the better it will be for your work throughout the year. Do not wait to enrol before starting to do some exploratory research and drafting your proposal.

Once you have identified a topic, an interim supervisor will be allocated to you, and you should work with this person to develop your research proposal so that you are ready to begin your research in earnest upon enrolment. Once enrolled, your proposal will be reviewed by the Programme Graduate Co-ordinator and your interim supervisor. You will receive feedback so that you can develop your project. Once your proposal and topic are approved, you will be allocated to a permanent supervisor with whom you will work throughout the year.

During the year, you will then be expected to:
· Submit an abstract/ topic statement (MARCH)
· Submit a research proposal (MARCH)
· Provide a written progress report (MAY)
· Give a short presentation on your approach and findings (AUGUST)
· Submit a draft version of your paper to your supervisor (SEPTEMBER)
· Submit the final version of your paper (OCTOBER).

GEOG 580 CRN 7766 RESEARCH PREPARATION 15 POINTS [2/3]

Coordinator:	Dr Andrew McGregor
Timetable:	Please see the VUW timetable http://www.victoria.ac.nz/timetables/
Assessment:	A literature review (30%), proposal presentation (20%) and a full research proposal (50%)

This course aims to prepare students for thesis research. It covers some of the generic issues and skills involved in research, such as choosing a topic, research design, data collection and analysis, communication and report writing. It also examines some of the issues and techniques that are particularly relevant to development research such as fieldwork, field methods, research ethics and relationships with participants.

By the end of the course, students should:

- Understand the nature and value of research;
- Understand the research process in terms of its main stages of planning, preparation; field research, data analysis, writing and presentation;
- Be aware of the importance of developing proposals, securing funding and managing budgets;
- Have knowledge of both quantitative and qualitative research methods;
- Be able to apply a range of appropriate field methods in working with human participants;.
- Have a critical understanding of the particular issues that face development research;
- Be able to write research proposals.

Competence in the above will be demonstrated through the preparation of research plans, budgets and a detailed research proposal that will form the basis of master's thesis research.

GEOG 580 is co-taught with ENVI 521, DEVE 514.

DEVELOPMENT STUDIES COURSES

DEVE 511 CRN 15920 DEVELOPMENT THEORY 15 POINTS [1/3]

Coordinator: Professor John Overton
Restrictions: DEVE 501
Assessment: 1 essay (20%), journal (20%) and exam (60%)

This course aims to introduce students to the wide range of theories about development that have appeared over the past 60 years and more. It involves an examination of 'development' and its various interpretations as well as its theoretical and ideological underpinnings. The course will cover the evolution of ideas about development and span a broad range of thinking about development and related concepts such as poverty, underdevelopment and inequality.

Topics covered include Western and non-Western perspectives and the historical context of development, market-based development theories, radical theories of dependency and world systems, alternative development including participation, gender and sustainability, and post development theories. Throughout, the links between development theory and policy will be explored.

DEVE 512 CRN 15921 DEVELOPMENT PRACTICE 15 POINTS [2/3]

Coordinator: Dr Andrew McGregor
Restrictions: DEVE 501
Assessment: 2 pieces of group work (10%, 35%)
3 pieces of individual work (15%, 15%, 25%)

This course aims to introduce students to some of the key issues involved, and techniques used, in development practice. It has two main aims. Firstly, it aims to construct a framework of critical issues for practice. This includes focusing upon ethics and professionalism and it also introduces students to the 'institutional landscape' of development. It covers topics such as development aid, development agencies, ethics and responsibilities and practices of participatory development. Secondly, the course leads students through the main elements of project cycle management and the principle issues and techniques used in managing development projects. Here topics and techniques such as project proposals, analysis, planning, implementation, monitoring and evaluation are covered.

DEVE 513 CRN 15922 DEVELOPMENT POLICY 15 POINTS [1/3]

Coordinator: Professor John Overton
Assessment: 2 written assignments (20% and 40%), peer assessment (20%) and group presentation (20%)

This course aims to cover the basic elements of development policy formulation using a 'hands-on' approach and practical work in policy development. The emphasis in this course is on developing an example of policy formulation, involving policy documents, role play negotiations, and group work. Although a fictitious country will be used as the context for study, real documents will be used and practical work will result in a draft policy statement for the country. In this course students will be expected to work in groups and participate fully in discussions, role plays and writing exercises. There is an emphasis on oral presentation skills alongside written work.

Topics covered include poverty reduction strategy papers (PRSPs), international policy frameworks (e.g. MDGs), donor agency policies, multi-donor harmonisation and alignment, domestic policy frameworks of government departments, local governments and NGOs, and issues of disbursement and monitoring.

ENVIRONMENTAL STUDIES COURSES

ENVI 504 CRN 7079 ENVIRONMENTAL ECONOMICS AND PUBLIC POLICY 30 POINTS [2/3]

Coordinator: Cath Wallace
Timetable: Please see the VUW website http://www.victoria.ac.nz/timetables/
Assessment: Coursework 60%, Final examination (2 hours) 40%
Recommended Reading: Textbook to be advised but which may be Common, M & Stagl S (2005) *Ecological Economics an Introduction,* Cambridge UP. ISBN 978-0-521-01670-4 plus readings as directed

This course is highly recommended for students seeking employment or other thinking roles where an understanding of policy and economics is required. It does not assume any prior economics or public policy background. The course draws on economics, policy, theory, law, ethics and other disciplines. The course will consider key debates and policy goals. It will allow students to develop an understanding of the essential elements of environmental policy theory and practice and the core of microeconomic theory as applied to the environment.

The connections, mechanics and limitations of the market, society and government will be explored. Insights into private and collective choice making and institutions in relation to environmental problems and management will be provided.

ENVI 505 CRN 7080 MĀORI ENVIRONMENTAL AND RESOURCE MANAGEMENT 30 POINTS [1/3]

Coordinator: Jessica Hutchings
Timetable: Please see VUW website
Assessment: 100% internally assessed.
Recommended Reading: Durie, M., *Te Mana Te Kawanatanga*; Smith, L., *Decolonising Methodologies*.

Additional Cost: $202. (wananga)

This course is very highly recommended for any students wanting to work in Aotearoa/New Zealand, but is also highly recommended for international students who need to consider indigenous issues or methodological issues of working cross-culturally. The course explores diverse Māori realities and values relating to natural resources and the environment; examines the implications of the Treaty of Waitangi for resource management in Aotearoa/New Zealand; and of the means of responding to the requirement to take account of the Treaty within the context of resource management practice. The course aims to develop students' critical thinking skills pertaining to Māori and environmental issues and to explore the issues of Pakeha and Māori identity with regard to the Treaty. The course is organised around two *wananga* (intensive learning periods), experiential learning and includes a marae stay.

ENVI 520 CRN 15675 ENVIRONMENTAL MANAGEMENT 15 POINTS [1/3]

Coordinator:	Associate Professor Ralph Chapman
Timetable:	Please see VUW website
Assessment:	Coursework 60 %, Final Examination 40%
Set Texts:	Readings will be arranged – check with course coordinator

This course explores frameworks and issues in resource and environmental management, providing a broad overview of the field and underpinning further study in the other courses. Students are encouraged to take a critical view and to develop an understanding of relevant conceptual frameworks and how they are applied in practical environmental management. Environmental policy analysis, stakeholder analysis and communications are considered. In addition to issues in current international environmental management, New Zealand frameworks for environmental management are explored. Readings will be set for each class meeting and students are expected to contribute to the discussions through oral participation.

ENVI 522 CRN 17362 ENVIRONMENTAL LAW 15 POINTS [1/3]

Coordinator:	Tom Bennion
Timetable:	Please see VUW website
Corequisites:	ENVI 523
Restrictions:	ENVI 503
Assessment:	2 x 10% short assignments, 40% research essay, 40% exam
Recommended Reading:	www.mfe.govt.nz. Ministry for the Environment *The State of New Zealand's Environment 1997* (GP Publications 1997). In particular chapters 1-4, 7 & 8. On closed reserve and three day loan. Updated at: www.mfe.govt.nz/publications/ser/enz07-dec07/index.html

A practical survey of the law and theories of law as they affect environmental management. Students will be introduced to the basics of environmental legal philosophy and principles applying to the making of law about environmental matters, as well as the basics of the NZ legal system and where environmental laws, the courts and government regulation fit into that system. Key statutes such as the Resource Management Act and Hazardous Substances and New Organisms Act will be introduced and their basic workings examined by way of case studies and practical exercises. The new emissions trading legislation and other law relating to climate change will also be surveyed.

ENVI 523 CRN 17361 PLANNING & THE RESOURCE MANAGEMENT ACT 15 POINTS [1/3]

Coordinator:	Tom Bennion
Timetable:	Please see the VUW website
Restrictions:	ENVI 503
Assessment:	2 x 10% short assignments, 40% research essay, 40% exam
Recommended Reading:	Environmental Defence Society Guide to the RMA at: http://www.rmaguide.org.nz/. In particular see the case studies on the site. Copy of the Resource Management Act 1991.

An in-depth look at how planning and environmental regulation happens under the RMA 1991 covering the making of national, regional and district and city planning documents, how plan changes and rules work and how decisions are made about resource consents and appeals are managed by the Environment Court. The paper will have a very practical focus using current planning documents and issues and hypothetical's arising from them. The aim is to have a working understanding of planning law in NZ by the end of the course. Because the course requires at the outset a basic knowledge of environmental law in NZ and the legal principles surrounding the interpretation and application of statutes, students will require either ENVI 522 or courses in legal studies as a corequisite/prerequisite.

ENVI 526 CRN 17359 HUMAN DIMENSIONS OF CONSERVATION 15 POINTS [2/3]

Coordinator:	TBA
Restrictions:	ENVI 506
Assessment:	Internal assessment 20% Final examination (2 hours) 40%
Set Texts:	Readings available via Blackboard

Conservation has been described as a crisis discipline. Conservation is also fundamentally about managing human impacts on biodiversity. The course examines fundamental techniques currently employed in conservation management. Students will become familiar with a broad range of conservation management methods and will utilise these tools to investigate a range of case studies from around the globe.

ENVI 527 CRN 17360 THE POLITICS OF ENVIRONMENT AND DEVELOPMENT 15 POINTS [2/3]

Coordinator:	Dr Sophie Bond
Restrictions:	ENVI 507 in 2006/07
Assessment:	TBA
Set Texts:	Paul Robbins, (2006) *Political Ecology*, Blackwell, Oxford.
Recommended Reading:	Additional readings will be provided on Blackboard.

This course uses a political ecology approach to explore issues at the interface of environmental conservation and development. Following an introduction to the foundations

of political ecology, the course focuses on key themes which will be explored through integrating theory with case study analyses from around the globe. Key themes may include:

- environmental degradation and associated social, political and economic marginalization;
- gender based dimensions of resource use;
- conservation and control;
- environmental conflict; and
- identity and social movements.

The course focuses on how factors such as socio political context, political economy, governance, environmental pressures and various identities interact in complex webs of relations. These relations present opportunities, challenges and constraints to how solutions are posed for environmental conservation and development projects.

ENVI 528 CRN 17358 CLIMATE CHANGE ISSUES 15 POINTS [2/3]

Coordinator: Associate Professor Ralph Chapman
Restrictions: ENVI 508
Timetable: Please see the VUW website
Assessment: Coursework 60%; final examination 40%
Set Texts: Readings will be arranged – check with course coordinator

This course aims to provide an understanding of issues in climate change science and policy and its implications for planetary management, both globally and in New Zealand. Students will become familiar with how the science, social science, policy and management issues associated with climate change can be integrated and handled more effectively. Students will have the opportunity to gain skills in assessing and discussing climate change science and policy.

ENVI 529 CRN 17357 SPECIAL TOPIC: SUSTAINABLE ENERGY 15 POINTS [1/3]

Not offered in 2012
Coordinator: Dr Eric Martinot
Assessment: Short assignments 45%, final research paper 45% , participation 10%.
Set Texts: Articles and readings from a variety of sources provided

This course aims to provide an understanding of sustainable energy globally and in New Zealand, including an understanding of technology characteristics, environmental impacts, economic costs, public policy options, and long-term future scenarios. Technologies covered include conventional fossil fuels, renewable energy, energy efficiency, and cleaner coal, as well as technologies for buildings, industry, and transport. Students will have the opportunity to gain the skills to assess and discuss sustainable energy systems, compare the costs and benefits of different technologies, and understand the range of public policy options.

GEOGRAPHICAL INFORMATION SCIENCE COURSES

GISC 401 CRN TBA FOUNDATIONS OF GEOGRAPHIC INFORMATION SCIENCE 15 POINTS [1/3]

Coordinator: Femke Reitsma (University of Canterbury)
Assessment : Written field work reports 30%, concept map of GIScience sub area 50%, in class discussions of readings 20%

An essential introduction to postgraduate GIS for the MGIS/PGDipGIS programmes. Students will cover a range of topics including conceptual models, representation, technology, data capture, theory and critical spatial thinking. Students will participate in an intensive field course where they will meet peers and staff, and learn and practice new skills.

The course will begin with a week-long residential intensive programme where students will gain practical knowledge on the use of equipment and data capture as well as learn about the breadth GIScience research.
The following ten weeks will involve both synchronous and asynchronous activities via the KAREN network, which will include:

- 2 discussion tutorials building on prior online forum discussions that consider selected current research topics
- Creation of a concept map the explores the breadth of a particular subarea of GIScience
- Synchronous presentations of the concept map

GISC 402 CRN TBA GISCIENCE RESEARCH 15 POINTS [2/3]

Coordinator: Femke Reitsma (University of Canterbury)
Assessment : Peer evaluated research proposal draft (20%), final research proposal (40%), online discussion of guest lectures (20%), proposal presentation 20%

This course educates students in the nature and breadth of GIScience research undertaken in academia, industry and government as well as to guide students in the development of a proposal to undertake their own research in GIScience. The course will include a series of guest lecturers providing insight into the landscape of employment or further research.

The course will be delivered mainly through lectures and activities presented synchronously and asynchronously online. Guest lectures on GIS research will be conducted via Access grid (or in person at the host institute), and these will be alternated with lectures and activities on GIS research skills. A high level of student participation in reading, discussion and group work will be expected.

GISC 403 CRN TBA CARTOGRAPHY AND GEOVISUALISATION 15 POINTS [2/3]

Coordinator: Mairead de Roiste (Victoria University)
Assessment : Labs 50%, forum contribution 5%, project proposal 10%, project 35%

This course provides a theoretical grounding in the various ways geographic information can be visualised. Beyond the conventional map display, alternate representations, interfaces to geographic data, visual exploration of datasets and cartographic generalisation will be covered. The course introduces the concepts, principles, theories and applied components of Cartography and GIS.

This course will be taught with a combination of lectures and practical work. The practical work will be completed in self- guided laboratory sessions, with a final presentation for assessment.

GISC 404 CRN TBA GEOSPATIAL ANALYSIS 15 POINTS [1/3]

Coordinator: Gregory Breetzke (University of Canterbury)
Delivery:
Assessment : Labs 30%, review of journal articles 45%, assignment 25%

This course provides an introduction to a range of statistical techniques used in the analysis of spatial data. A comprehensive lab programme uses a variety of software packages to explore visualisation, exploratory spatial data analysis, spatial autocorrelation, point pattern analysis, spatial statistics and the modifiable areal unit problem (MAUP).

The course would be taught using blended learning, with a combination of on-campus and on-line delivery.

- Lectures will take place in short intense bursts on-campus
- Labs will take place every fortnight. Synchronous online weekly discussion forums will also be utilised to develop research skills

A high level of student participation in reading, discussion and group work will be expected.

GISC 405 CRN TBA GIS PROGRAMMING AND DATABASES 15 POINTS [1/3]

Coordinator: Carl Cerecke (University of Canterbury)
Assessment : Independent project 30%, test 40%, lab exercises 30%

This course will develop students' ability to use programming methods for extending existing GIS software and composing open source components for GIS functionality. The knowledge and skills learned in this course will support a range of applications including data processing, visualisation, advanced spatial analysis, public participatory GIS and webGIS.

This course will be taught in a combination of lectures and practical lab exercises. Lectures will also be streamed to allow distance students at Victoria to participate in the course.

GISC 406 CRN TBA REMOTE SENSING FOR EATH OBSERVATION 15 POINTS [1/3]

Coordinator: Wolfgang Rack (University of Canterbury)
Assessment : Lab exercises 15%, literature review 35%, data analysis task and essay 35%, presentation 15%

This course explores the use of data from earth orbiting satellites for monitoring and analyzing the state of the environment from local to regional scales. It provides practical experience in data analysis from a range of earth observation sensors to obtain information on surface properties in 3 dimensions. The course will be taught through seminars, small group discussions, and labs. Students will be provided with a reading list for the seminars and are expected to contribute to the discussion. Students will be asked to give a 10 minute summary of the topics based on their pre-seminar readings. Pre-seminar readings will be completed prior to the relevant seminar (approximately 10 hours per week). The first half of the semester will concentrate on the satellite applications and satellite data lab work. Applications, the literature review, essay, and seminar presentation will be completed during the second half of the semester and will develop student skills in planning research and communicating it effectively.

GISC 411 CRN TBA GEOGRAPHIC INFORMATION SCIENCE IN HEALTH 15 POINTS [1/3]

Coordinator: Amber Pearson (University of Canterbury)
Assessment : Lab assignments 40%, Research proposal 60%

This course will provide students with an introduction to the application of Geographic Information Science (GIS) in the study of health, disease and health care. Students will be expected to apply these GIS methods in developing a research proposal.

The course will be taught with a combination of several block-taught lectures with academic staff and input from guest lecturers knowledgeable in the use of GIS in health research, public health and health care, along with self-guided laboratory work. The format of the teaching includes formal lectures, class discussion, prescribed reading and practical GIS work in self-guided labs. The course is based in Christchurch, but as part of the MGIS is accessible to distance students in Wellington. As such, teaching will be conducted through Access Grid.

GISC 412 CRN TBA SPATIAL ALGORITHMS AND PROGRAMMING 15 POINTS [2/3]

Coordinator:	Femke Reitsma (University of Canterbury)
Assessment :	Lab assignments 40%, group project 50%, group presentation 10%
Prerequisites:	GISC 405: GIS Programming and Databases

This course builds on MGIS405 to develop students' ability to use python in GIS software such as ArcGIS as well open source, and to understand and create spatial algorithms. Largely lab and project based, where the context and theoretical framework is presented in lectures and tutorials to guide hands on development.

This course is heavily lab and project based, where the context and theoretical framework of the course is presented in lectures and tutorials in order to guide hands on practical work and development.

This course will be taught in three intensive full day sessions, which mix lectures with lab exercises throughout the day, ending with a lab assignment the students will complete during the rest of the week. The rest of the semester will involve weekly tutorials relating to the group programming project.

GISC 413 CRN TBA SPECIAL TOPIC: GEOMATIC DATA ACQUSITION TECHNIQUES 15 POINTS [2/3]

Coordinator:	Kelvin Barnsdale (University of Canterbury)
Assessment :	Lab assignments 15%, assignments 40%, mini project 45%

Students will gain a broad understanding of the techniques and issues involved with position measurement and capture of geographic data or images. Much of the course material will concentrate on airborne photography, but other remote sensing, positioning and data gathering platforms will be included, including GPS, oceanic platforms and sensors.

The course will be taught through a combination of weekly lectures and fortnightly laboratory/practical work. Students will be introduced to key concepts during lectures, which will be complemented with practical exercises during the laboratories. Students will also be required to complete a group project in planning, preparing, actioning, and post-processing a data collection exercise, the outcomes of which will be presented in a student seminar in the penultimate week of the course.

GISC 415 CRN TBA GIS INTERNSHIP 15 POINTS [2/3 OR 3/3]

Coordinator: Femke Reitsma (University of Canterbury)
Assessment : 100 hours work, work plan 10%, job diary 20%, hosting organisation report 50%, presentation 10%

This course allows students to utilize their knowledge gained from the PGDipGIS/MGIS postgraduate courses within business, government and non-profit organisations while gaining career-related work experiences, exploring compatibility with specific careers and companies, and becoming more mature professionally.

This course will be delivered through experiential learning, with students placed in GIS internship positions in industry/government/ not-for-profit organisations where they actively participate in GIS project work.

A 0.125 EFTS MGIS internship must incorporate a minimum of 100 hours of work in a supervised position that involves GIS development, support, administration, or maintenance. This may be achieved as a part-time internship position in Semester 2, or as a full-time summer internship.

Evaluation of learning will occur through a written report and presentation based on daily work diaries, with students providing reflection on their experiences.

GISC 416 CRN TBA SPECIAL TOPIC 15 POINTS [2/3]

Coordinator: Femke Reitsma (University of Canterbury)

Special topic GIS course offered by visiting academic. May not be offered in each year.

It is envisaged that the content of the special topic course will be developed by the visiting academic in collaboration with existing MGIS staff, so as to ensure complementarity with other courses in the programme. The nature of any particular special topic course will aligns with the pedagogical style and content of the overall MGIS programme.

PHYSICAL GEOGRAPHY COURSES

PHYG 414 CRN 15669 CLIMATE CHANGE: LESSONS FROM THE PAST 15 POINTS [1/3]

Coordinator: Prof Rewi Newnham
Restriction: PHYG 412
Assessment Coursework 50%; final examination (2 hours) 50%

The course examines the contemporary issue of climate change in the context of the past (Quaternary paleoclimate) and future projections. It aims to develop a longer term perspective on contemporary climate change than can be achieved from the instrumental era. A key concept is "lessons from the past" derived from the record of environmental change during the Quaternary period (since c. 2.6 million years ago) and how these can inform understanding of contemporary climate change science as well as underpin future projections of climate and climate impacts. The emphasis here will be on terrestrial records and environments (although marine and ice core records remain relevant) and a key focus will be New Zealand in the context of global patterns. Recent advances in the periodical literature are emphasised.

PHYG 415 CRN 15680 SPECIAL TOPIC A: INTRODUCTION TO GEOGRAPHIC INFORMATION SCIENCE AND SYSTEMS (GIS) 15 POINTS [2/3]

Coordinator: Dr Mairéad de Róiste
Assessment Coursework 100%
Recommended Reading: Longley, P.A., Goodchild, M.F., Maguire, D.J. & Rhind, D.W. 2005, Geographic Information Systems and Science, 2nd edn, Wiley, London.
or
Heywood, I., Cornelius, S and Carver, S. 2002, An introduction to geographical information systems, 2nd edn, Prentice Hall, New York.

NB: You cannot enrol in this course if you have previously completed either GEOG 215 or GEOG 315

Geographic Information Systems (GIS) can be used to answer a number of spatial questions. It is currently used in a variety of areas, such as criminal profiling, biology, geography, disaster management, marketing, access to health care, conservation monitoring and archaeology. This course will introduce students to the principles of GIS including thinking about spatial problems, appropriate data, types of analysis you can undertake and how to present your results. The course runs a number of concurrent practical sessions, which allow you to build your experience of a particular GIS software program (ArcGIS).

PHYG 416 CRN 17256 SPECIAL TOPIC B 15 POINTS [1/3]

Coordinator:: TBA
Prerequisites: TBA

PHYG 417 CRN 15670 HYDROLOGICAL PROCESSES AND MODELLING 15 POINTS [2/3]

Coordinator:	Dr Bethanna Jackson
Prerequisites:	GEOG 220 +1 MATH /STAT or PHYS 100 level paper
Assessment	Project design 20%, project report 40%, exam (3 hour) 40%

This course aims to provide an understanding of the dominant components of the water cycle at local and global scales and to introduce students to the variety of modelling tools and other assessment methods available for hydrological system assessment. Firstly, the processes governing surface, subsurface and atmospheric movement of water are introduced. Global water and energy cycles, soil water flow processes, evapotranspiration, groundwater and catchment scale rainfall runoff processes are covered. Secondly, it looks at how hydrological models are built and introduces a range of available models in the commercial and research domains, examining situations in which particular models may be more or less suitable for a given purpose. Finally, case studies applying and interpreting model results are used to explore how such tools can be used for hydrological evaluation, predictions, and to improve our understanding of both specific sites and fundamental processes.

Please note this course requires use of the programme Matlab, which is available on school teaching laboratory computers. If you wish to use this programme off-campus, you will need to purchase your own student license (cost at time of printing approximately 150 NZD).

PHYG 418 CRN 15671 GEOMORPHOLOGY AND ITS APPLICATION 15 POINTS [1/3]

Coordinator:	Dr Kevin Norton
Assessment	Coursework 60%; final examination (3 hours) 40%)
Recommended Reading:	TBA

This course explores the application of geomorphology to understanding landscape change. The focus is on landscapes as dynamic entities in which tectonic and erosive forces combine to create, shape and ultimately destroy topography. These dynamic processes act constantly to drive changes in landforms either towards or away from quasi-stable states. Understanding Earth's surface requires knowing how landforms have developed, which processes are currently acting on these surfaces, and how they might respond to future change. To this end, geomorphology is presented as an interdisciplinary subject, drawing on concepts and tools from across the physical sciences in an effort to disentangle the often combined effects of geologic, climatic, and anthropogenic forces.

A small number of specific topics and methods will be examined with reference to the modern geomorphic literature.

PHYG 419 CRN 15672 NATURAL HAZARDS AND RISK: PROCESSES AND IMPACTS 15 POINTS [2/3]

Coordinator: TBA
Assessment: 50% exam, 50% coursework

Hazards are a key dimension of the natural landscape. Storms formed in the open ocean cause major damage globally as typified by Hurricane Katrina hitting New Orleans in 2004, and Cyclone Nargis striking the Burmese coast in 2008. In addition major events such as the Boxing Day tsunami of 2004 also pose major risk to coastal environments. Such events cause billions of dollars of damage and cost 100,000's of lives around the globe. It is therefore critical to understand the nature and operation of the hazard itself, but also the theory and practical management of such hazards. This course therefore aims to provide the theory of hazard management from vulnerability to risk and hazard. Viewing hazards through the lens of the coast the course explores all the major hazards facing settlements of the edge of the sea. The course therefore provides an understanding of the nature, distribution and frequency of natural hazards both within New Zealand and globally. It analyses the causes of natural hazards, the processes driving them, and methodologies in their analysis.

The course is divided into two main themes

Theme 1: Natural Hazard Theory

- Hazard
- Risk
- Vulnerability

Theme 2: Physical Hazards of the Coast

- Tsunami
- Storm Surge and Cyclones
- Climate Change and Sea Level Rise
- Coastal Erosion

Note: Running of this course in 2012 is subject to staff availability

PHYG 420 CRN 17257 WATER RESOURCES 15 POINTS [2/3]

Coordinator: Dr Bethanna Jackson
Assessment: TBA
Assessment Report 30%, assignment 10%, exam (3 hour) 60%

This course aims to provide the skills necessary to undertake an analysis of the water resources of a region or catchment. It covers three broad areas. First, it explores the concepts of rights, ownership, types of usage, and planning mechanisms with respect to water resources. Second, it focuses on the assessment, measurement, and quantification of surface and subsurface water resources, together with the methods and requirements of data acquisition. Issues relating to the assessment, quantification, and monitoring of water quality will also be studied. Finally, the course looks at the effects, both physical and social, of manipulating water resources and the mechanisms available for resolving conflicting usage requirements.

PHYG 423 CRN 15673 FIELD GEOMORPHOLOGY 15 POINTS [1/3]

Coordinator: TBA
Assessment : 100 % internal assessment
Recommended Reading: Coates, G. 2002. *The Rise and Fall of the Southern Alps*. Canterbury University Press; Soons, J.M. & Selby, M.J. (eds.) 1992. *Landforms of New Zealand* (2nd edn.). Longman Paul; Darby, J. *et al*. 2003. *The Natural History of Southern New Zealand*. University of Otago Press .

Through a field examination of the landform systems of New Zealand, this course analyses contemporary and past landform evolution, and its impacts on society. It is focussed around an intensive fieldwork programme conducted on the South Island, whereby geomorphic systems from the high alps to coastal plain are investigated and the linkages between them discussed. Issues such as climate change and glacial processes, hillslope instability, coastal erosion and landform evolution are covered in the context of the spectacular environment of the active New Zealand landscape.

PHYG 440 CRN TBA DIRECTED INDIVIDUAL STUDY 15 POINTS [1+2/3]

Coordinator: TBA
Assessment : 100 % internal assessment
Prerequisite: Approval from the HOS

For more information please contact the Graduate Co-ordinator (Andrew Mackintosh)

PHYG 489 CRN 1150 RESEARCH PROJECT 30 POINTS [1+2/3]

Coordinator:	Dr Andrew Mackintosh
Timetable:	Your individual timetable for this course is flexible. However, you are recommended to allocate the following times to research related activities: Weekly or monthly supervision meetings as agreed with your supervisor; two hours per week of seminars and discussion in Research Preparation sessions
Assessment:	Research project 100%
Recommended Reading:	McConchie, J.A. (2000) *Research Project Guide* (available from the Graduate Co-ordinator); previous Geography Honours Projects (available in School Library); *School of Geography, Environment and Earth Sciences Graduate Student Handbook*

This course involves the formulation and execution of a research project of your own choice under the guidance of a staff member. It is compulsory for all those enrolled for BSc(Hons) in Physical Geography.

If you are considering taking an honours degree in Physical Geography make an appointment to see the Graduate Co-ordinator, Dr Andrew Mackintosh, who will offer guidance, discuss resources, and point you to potential supervisors. It is important that you discuss possible research topics with appropriate staff *before* the academic year commences.

PHYG 489 provides you with the opportunity and forum to design and carry out an independent research project on a topic of your choice. It involves training support in research design, approach and methods through research preparation sessions, the Staff-Student seminars and one-on-one sessions with a supervisor.

You will need to discuss a possible topic with a staff member prior to enrolling in February. The sooner you can narrow down your focus the better it will be for your work throughout the year. Once you have identified a topic, an interim supervisor will be allocated to you, and you should work with this person to develop your research proposal.

Your proposal will be reviewed by the Graduate Committee along with your interim supervisor. You will receive feedback so that you can develop your project. Once your proposal and topic are approved, you will be allocated to a permanent supervisor with whom you will work throughout the year.

Throughout the year, you will also be expected to:

Submit a topic statement (MARCH)
Submit a research proposal (MARCH)
Provide a written progress report (MAY)
Give a short presentation on your approach and findings (AUGUST)

Submit a draft version of your research paper (SEPTEMBER)
Submit the final version of your research paper (OCTOBER)

PHYG 580 CRN 7768 RESEARCH PREPARATION 15 POINTS [2/3]

Coordinator: Dr Andrew Mackintosh
Assessment: 100 % internal assessment

This course is designed to introduce you to good research practice, and is focused on the development of a research proposal. It is compulsory for students enrolled in Part 1 of an MSc(Hons) programme. You will participate in a series of core lectures and workshops, as well as targeted discipline- specific workshops. You will write a literature review on a topic relevant to your focus study and you will also present a seminar to the class. The major piece of work is a research proposal and together with your supervisors you will work towards preparing this proposal for the research you will do in Part 2 of the Masters degree.

GEOLOGY COURSES

Meeting times for Geology Honours course seminars are organised during the first week of Trimester 1, to suit the commitments of staff and students. Generally, each full course consists of one 2-hour seminar per week, for approximately 8-10 weeks. All courses are worth 15 points, apart from the project (GEOL 489), which is 30 points.

ESCI 403 CRN 15245	**STRATIGRAPHY PALEOENVIRONMENTS**	**15 POINTS**	**[1/3]**

Coordinator: Prof Peter Barrett
Prerequisite: ESCI 301 or GEOL 361
Restriction: GEOL 403
Assessment: Final examination 75%, Internal assessment 25%

This course begins by reviewing principles of stratigraphy and then considers several approaches for studying past environments, such as facies analysis and sequence stratigraphy. The later part of the course comprises seminars with examples of the use of geochemical and paleontological proxies for studying past changes in Earth's environment and climate over the last 100 million years.

ESCI 404 CRN 15246	**TOPICS IN EARTH SCIENCES**	**15 POINTS**	**[1+2/3]**

Coordinator: Dr Warren Dickinson
Prerequisite: Appropriate 300-level ESCI or GEOL courses
Restriction: GEOL 404
Assessment: Final examination 100%

This course consists of a selection of two or more topics, each equivalent to half a course. Students must take at least two special topics, but may attend more if they wish. The topics are chosen at the start of the year, and the offering varies from year to year depending on staff availability and student interest. Typically four or five topics are offered each year. Recent topics include: active tectonics, glacial geology, structural geology, volcanology, sedimentary petrology, palaeoclimatology, cosmochemistry, geochemical methods, isotope geochemistry, and evolution.

ESCI 406 CRN 15247	**PETROLEUM GEOLOGY**	**15 POINTS**	**[1/3]**

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Coordinator: A/Prof John Collen
Prerequisite: ESCI 304 or GEOL 364
Restriction: GEOL 406
Assessment: Final examination 75%, internal assessment 25%

The subject matter for petroleum geology and geochemistry falls into two main areas. The principles of petroleum geology and geochemistry are discussed in detail, together with their

application to exploration. Secondly, a number of case histories are covered that exemplify the previous material.

ESCI 407 CRN 15248 GLOBAL TECTONICS 15 POINTS [1/3]

Coordinator: A/Prof John Townend and A/Prof Tim Little
Prerequisite: ESCI 302 or GEOL 362 or 366
Restriction: GEOL 407
Assessment: Final examination 75%, Internal assessment 25%

ESCI 407 is concerned with the tectonics of global plate boundary settings as well as general principles in geodynamics and geotectonics. Topics vary from year to year, but on odd years often focuses on the New Zealand plate boundary zone, including its seismicity and seismo-tectonics, geodetic strain, development of the Hikurangi margin, tectonics of the Taranaki and Whanganui Basins, and the origin and structure of the Southern Alps and Alpine Fault. On even years it focuses more generally on the mechanics and kinematics of faulting in the continental crust, with special emphasis on rifts and strike-slip or transpression zones.

ESCI 408 CRN 15250 17081 SPECIAL TOPICS 15 POINTS [1+2/3] [2/3]

Coordinator: TBA
Prerequisite: Appropriate 300-level ESCI or GEOL courses

Assessment: TBA

See entry for ESCI 404.

ESCI 411 CRN 15254 ADVANCED EXPLORATION GEOPHYSICS 15 POINTS [2/3]

Coordinator: TBA
Prerequisite: ESCI 305 or GEOL 367
Restriction: GEOL 411
Assessment: Final examination 75%, internal assessment 25%

ESCI411 covers geophysical topics relevant to earth science research in New Zealand and elsewhere. It deals with seismic exploration, anisotropy in rocks, seismic wave attenuation and amplitude behaviour, gravity studies, geodesy, geophysics and geothermal studies, palaeomagnetism, Ground Penetrating Radar (GPR) and also includes reflection seismic processing.

ESCI 412 CRN 15255	PALEOCLIMATOLOGY	15 POINTS	[1/3]

Coordinator: Dr Gavin Dunbar
Prerequisite: ESCI 301 or GEOL 365
Restriction: GEOL 412
Assessment: Final examination 75%, internal assessment 25%

ESCI 412 is a study of contemporary research papers in Paleoclimate science. We concentrate on environmental proxy indicators, dating methods and climate dynamics. The course examines prominent Quaternary records from New Zealand as well as high profile records from elsewhere (for example, polar ice and sediment cores and tropical climate records from speleothems). We also develop an understanding of how the atmosphere, ocean and cryosphere influence climatic change as recorded in the geological record. This includes a discussion of orbital forcing (Milankovitch cycles) as well as sub-orbital features such as Dansgaard-Oeschger events and ENSO.

ESCI 413 CRN 15257	GEOCHEMICAL FORENSICS OF EARTH'S ORIGINS, HISTORY AND FUTURE	15 POINTS	[2/3]

Coordinator: Prof Joel Baker
Prerequisite: ESCI 303 or GEOL 363 or GEOL 333
Restriction: GEOL 413
Assessment: Final examination 75%, internal assessment 25%

ESCI 413 is an advanced course in current and fundamental topics in geochemistry. The course will cover principles and applications of geochemistry that range from studying analytical techniques, formation of elements in stars, Solar System origins, accretion and differentiation of the rocky planets, early evolution of Earth's lithosphere, atmosphere and biosphere, geochronology, igneous geochemistry, geochemical and isotopic proxies of past environmental change, tracking the life history of fish and mammals, archaeology, and environmental chemistry.

ESCI 414 CRN 15181	PHYSICS AND CHEMISTRY OF VOLCANOES	15 POINTS	[1/3]

Coordinator: Prof Colin Wilson
Assessment: Internal assessment 100% (3 seminars; 1 Final Report)
Recommended Reading: Sigurdsson, Encyclopaedia of Volcanoes (VUW Library, print and online)

An advanced course covering how volcanoes work and how they can be studied from the products of past eruptions, as well as from present-day information. The course is focussed around case studies that have been done by the lecturers or their colleagues, and is also designed to prepare students to tackle the challenges involved in research presentation. As part of the course, each student will present 3 x 15 minute seminars on topics based around topics covered in the lectures, and each student will be allocated a topic from which to prepare a detailed essay as an examination report.

ESCI 416 CRN 15259 METAMORPHIC PETROLOGY 15 POINTS [2/3]

Coordinator: Dr Julie Vry
Prerequisite: ESCI 303 or GEOL 363
Restriction: GEOL 414
Assessment: 100 % Final examination (3 hr)

ESCI 416 begins by reviewing basic concepts in modern metamorphic petrology, then uses research literature to help expand understanding of how the key variables of pressure, temperature, time, deformation, and fluid / rock interaction are assessed and interpreted, and the resulting specific and broad geological implications as to conditions and processes in various geological settings.

SUBJECT TO APPROVAL
ESCI 449 CRN TBA EARTH SCIENCES – INTERNATIONAL FIELD COURSE 20 POINTS [3/3]

Coordinator: A/Prof Brent Alloway
Prerequisites: 60 pts of 200-level ESCI or GEOG including either ESCI 241 or GEOG 223
Restriction: ESCI 349
Assessment: Field trip and field exercises 50%
Field report 50%

This international field course in earth sciences aims to examine key geographical, geological and/or geophysical localities. The course will offer a variable but unique insight, understanding and experience of earth sciences in the field beyond that which already exists in New Zealand.

ESCI 441 CRN 15260 DIRECTED INDIVIDUAL STUDY 15 POINTS [1+2/3]

Prerequisite: Permission of the Head of School

GEOL 489 CRN 1773 RESEARCH PROJECT 30 POINTS [1+2/3]

Coordinator: Individual project supervision
Assessment: Research project internally assessed

This is the research project for students enrolled in BSc Honours in Geology. It consists of a piece of independent research that usually involves both field and laboratory work under the supervision of one or more staff members. Most students begin their fieldwork during the December-February period, before seminars begin, and the projects are submitted in early September. In terms of assessment, GEOL 489 is equivalent to two Honours courses.

GEOL 580 CRN 7770 17439 RESEARCH PREPARATION 15 POINTS [1+2/3]

Coordinator: Prof Euan Smith
Assessment: Research project internally assessed

The course aims to provide the skills and techniques required for successful scientific research in Earth Sciences including: philosophy of science; bibliographic database searches; writing, reviewing and revision of proposals, abstracts and journal papers; strategies for poster and oral presentations. Students will work with their MSc project supervisor to develop a research proposal for their project and also on a small research project, which are both due at the end of the course as part of the assessment, along with an oral presentation of the research proposal. The course is taught jointly with GPHS 580 and PGEO 580.

PETROLEUM GEOSCIENCE COURSES

PGEO 401 CRN 13747 BASIN ANALYSIS 15 POINTS [2/3]

Coordinator:	Prof Tim Stern (VUW) Martin Crundwell (GNS Science)
Prerequisites:	ESCI/GEOL 403, 407
Assessment:	Final examination 70%, internal assessment (essay and seminar presentation) 30%
Course Costs	$44.20

Jointly taught with GNS Science. Students will be expected to understand the process of integrating geological, geochemical and geophysical data to provide a history of a sedimentary basin's formation, growth and to demonstrate an understanding of its sedimentary fill. Students will then assess the potential for a basin to produce hydrocarbons through the analysis of possible hydrocarbon sources in the basin fill and the development of a thermal model to investigate source maturity.

PGEO 511 CRN 13748 TECHNICAL PETROLEUM GEOSCIENCE 15 POINTS [2/3]

Coordinator:	Prof Tim Stern (VUW)
Assessment:	100% internal – a combination written reports on work accomplished as well as an oral presentation.
Course Costs	$ 44.20

Jointly taught with GNS Science. The course offers practical exposure to the state of the art facilities used in petroleum exploration. Students will be expected to become familiar with data collection and manipulation and the presentation of results in conference type settings.

PGEO 580 CRN 13749 RESEARCH PREPARATION 15 POINTS [1+2/3]

Coordinator:	Prof Euan Smith
Assessment:	100% internal assessment

Skills and techniques required for successful scientific research in Petroleum Geoscience including: philosophy of science; bibliographic database searches; writing, reviewing and revision of proposals, abstracts and journal papers; strategies for poster and oral presentations. Students will work with their MSc project supervisor to develop a research proposal for their project and also on a small research project, which are both due at the end of the course as part of the assessment, along with an oral presentation of the research proposal.

This course is taught jointly with GEOL 580 and GPHS 580.

GEOPHYSICS GRADUATE COURSES

GPHS 420 CRN 8156 INTRODUCTION TO DYNAMICAL METEOROLOGY 15 POINTS [1/3]

Coordinator: Dr James McGregor
Prerequisites: MATH 323
Assessment: Course work (20%), final examination (80%)
Recommended Reading: Synoptic-Dynamic Meteorology in Midlatitudes, Volume 1; Principles of Kinematics and Dynamics, Howard B. Bluestein, Oxford University Press, 1991; Synoptic-Dynamic Meteorology in Midlatitudes, Volume 2; Observations and Theory of Weather Systems, Howard B. Bluestein, Oxford University Press, 1991.

This course introduces students to the fundamental concepts of dynamical meteorology and develops skills in problem solving.

GPHS 421 CRN 8157 MID-LATITUDE WEATHER SYSTEMS 15 POINTS [1/3]

Coordinator: Dr James McGregor
Recommended Reading: *An Introduction to Dynamical Meteorology*, J.R. Holton, 3rd edition, Academic Press, 1992; *Mid Latitude Weather Systems*, Toby N. Carlson, Harper Collins Academic, 1991; *Synoptic-Dynamic Meteorology in Midlatitudes, Volume 1; Principles of Kinematics and Dynamics*, Howard B. Bluestein, Oxford University Press, 1991; *Synoptic-Dynamic Meteorology in Midlatitudes, Volume 2; Observations and Theory of Weather Systems*, Howard B. Bluestein, Oxford University Press, 1991.

This course extends the knowledge gained in GPHS 420 to the development of an understanding of weather systems in middle latitudes. Special emphasis is paid to weather systems in NZ and the Tasman Sea region.

GPHS 422 CRN 8158 RADIATION AND THERMODYNAMICS FOR METEOROLOGY 15 POINTS [1/3]

Coordinator: Dr James McGregor
Assessment: Course work (20%), final examination (80%)
Recommended Reading: *Atmospheric Science: An Introductory Survey*, John M. Wallace and Peter V. Hobbs, Academic Press, 1977; *Satellite Meteorology*, S.Q. Kidder and T.H. Vonder Haar, Academic Press, 1995; *A Short Course in Cloud Physics*, R.R. Rogers and M.K. Yau, 3rd edition, Butterworth-Heinemann, Reprinted 1996

Students are introduced to the concepts of radiation and thermodynamics that are relevant to applications in meteorology and atmospheric physics. Students who are intending to enrol for GPHS 424 Satellite Meteorology should complete this course first.

GPHS 423 CRN 8159 CLOUD PHYSICS AND BOUNDARY LAYER METEOROLOGY 15 POINTS [2/3]

Coordinator: Dr James McGregor
Recommended Reading: *A Short Course in Cloud Physics*, R.R. Rogers and M.K. Yau, 3rd edition, Butterworth-Heinemann, Reprinted 1996; *An Introduction to Boundary Layer Meteorology*, R.B.Stull, Kluwer Academic Publishers, 1988

This course investigates the microphysical properties of clouds. The meteorology of the lower boundary layer of the Earth's atmosphere is also examined.

GPHS 424 CRN 8160 SATELLITE METEOROLOGY 15 POINTS [2/3]

Coordinator: Dr James McGregor

Assessment: Course work (20%), final examination (80%)
Recommended Reading: *Satellite Meteorology*, S.Q. Kidder and T.H. Vonder Haar, Academic Press, 1995; *Satellite Orbits - models, methods and applications*, Motenbruck, O. and Gill, E. Springer, 2005

This course examines the contribution and impact that satellites have on modern meteorology. Geostationary and Polar orbiting satellite programmes of the major meteorological satellite operators are examined. The orbital dynamics and attitude control of satellites is examined and particular attention is paid to meteorological instrumentation and applications.

GPHS 425 CRN 11096 NUMERICAL WEATHER PREDICTION 15 POINTS [2/3]

Coordinator: Dr James McGregor

Prerequisites: GPHS 420
Recommended Reading: *Atmospheric Modeling, Data Assimilation and Predictably*, Eugenia Kalnay, Cambridge University Press, 2003

Numerical Weather Prediction (NWP) is examined within the context of modern weather forecasting. It includes material on the historical development of NWP, wave properties of the governing mathematical equations, numerical methods, model physics, statistical methods in post-processing, ensemble forecasting, and applications of global and limited area NWP in modern weather forecasting operations.

GPHS 441 CRN 9063 SOLID EARTH AND GEOPHYSICS 15 POINTS [2/3]

Coordinator: Prof Euan Smith
Restrictions: GPHS 405, PHYS 406, 441
Assessment: Internal (20%), final examination (80%)
Recommended Reading: Frank Stacey, *Physics of the Earth*

Methods of radiometric dating, the age of the Earth, and the thermal and gravitational structures of the Earth. Also taught as PHYS 441.

GPHS 445 CRN 9067 OBSERVATIONAL EARTHQUAKE SEISMOLOGY 15 POINTS [1/3]

Coordinator: Prof Martha Savage
Prerequisites: MATH 323
Restrictions: GPHS 409
Assessment: Internal (20%), final examination (80%)
Set Texts:
Recommended Reading: Stein and Wysession, *An Introduction to Seismology, Earthquakes and Earth Structure*, 2003
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This course provides an introduction to observational earthquake seismology and its contribution to the development of Earth models. Students will learn the fundamental concepts and processes of seismic wave generation, propagation, recording and analysis in idealised media and in the real earth.

GPHS 446 CRN 9068 ADVANCED SEISMOLOGY 15 POINTS [2/3]

Coordinator: Prof Euan Smith
Prerequisites: MATH 323, GPHS 445
Restrictions: GPHS 409
Assessment: Internal (20%), final examination (80%)
Recommended Reading: Stein and Wysession, *An Introduction to Seismology, Earthquakes and Earth Structure*, 2003 P.M. Shearer *Introduction to Seismology*, 1999

This course provides an introduction to theoretical seismology and the use of theoretical and observational earthquake seismology to study Earth structure and earthquake source theory. Students will learn the basics of signal analysis, the mathematical theory behind earthquake source physics, and the creation and use of synthetic seismograms to study earth structure and source processes. Applications examined may include some or all of the following, depending on student and lecturer inclinations: earthquake location, seismotectonics and seismic anisotropy.

GPHS 447 CRN 9605 GEOMAGNETISM 15 POINTS [1/3]

Coordinator: Dr Malcolm Ingham
Restrictions: GPHS 408, 442, PHYS 406, 442, 447
Assessment: Internal (20%), final examination (80%)

Physical and mathematical description of the geomagnetic field, spectrum of time variations, secular variation, reversals and sea-floor anomalies, origin of the geomagnetic field, introduction to palaeomagnetism and electromagnetic induction in the Earth. Also taught as PHYS 447.

GPHS 489 CRN 1891 PROJECT 30 POINTS [1+2/3]

Coordinator: Prof Euan Smith
Assessment: Research Project (100%)

A research project on a topic approved by the Head of School.

GPHS 580 CRN 7771 RESEARCH PREPARATION 15 POINTS [1+2/3]

Coordinator: Prof Euan Smith
Assessment: Internal (100%)

The course aims to provide the skills and techniques required for successful scientific research in Earth Sciences including: philosophy of science; bibliographic database searches; writing, reviewing and revision of proposals, abstracts and journal papers; strategies for poster and oral presentations. Students will work with their MSc project supervisor to develop and submit for grading a research proposal for their project. This is due at the end of the course as part of the assessment, along with an oral presentation of the research proposal.

The course is taught jointly with GEOL 580 and PGEO 580.

ACADEMICS - RESEARCH AREAS

GEOGRAPHY

Staff teaching in the Geography programme are active in carrying out research in a wide range of fields. For the next five years, Geography's research priorities lie in the following areas:

Human Geography

- Globalisation and rural change in the Asia Pacific, Oceania and Latin America
- Rural change, regional development and industrial restructuring
- Local labour markets, housing and community development
- The geography of well-being
- Relationships between place, identity and social cohesion in rural communities of Aotearoa/New Zealand
- Gender and urban space in Aotearoa/New Zealand
- GIS and spatial analysis

Environmental Studies

- Climate change, energy, transport, urban design and environmental health
- Biodiversity management, including wilderness, native forest and protected areas
- Maori approaches to environmental management/Treaty of Waitangi
- Economic, legal and other tools for resource management
- Public involvement processes: consultation to co-management
- Environmental education, communication and conflict resolution

Development Studies

- Development theory and practice
- Interface with NZ Aid and DevNet
- Project formulation in partnership with agencies
- Participatory approaches, with particular reference to poverty issues
- Monitoring and evaluation of development projects

We are delighted if students propose topics which fit into the overall directions we are developing. As can be seen from the above list, there is a great deal of scope for suggesting topics, and we encourage you to discuss your ideas with one of the staff. Please also consult our Web page for current research interests of individual staff:
http://www.victoria.ac.nz/geo/

PHYSICAL GEOGRAPHY

Both individual and contract research is undertaken in physical geography (contracts have been completed for the Wellington City Council, Wellington Regional Council, Tonkin & Taylor, as well as work for the Ministry of Foreign Affairs and Trade, Mighty River Power Ltd

and United Nations agencies). The following list is not exhaustive but illustrates topics being investigated by our current postgraduate students in physical geography.

- Contemporary earth surface processes: landslides, soil erosion, hydrology, and fluvial activity
- Slope stability and climate/process studies
- The relationship between people and the natural environment: natural hazards, recreational and land use impacts
- Coastal landforms and processes
- Long term landscape evolution
- Graphic representation and analysis: hazard mapping, terrain representation, and GIS
- Glaciers and climatic change
- Sea level variation, both past and future.
- Reconstructing past climate change and human-environment interaction through the use of palaeoecological techniques
- Modelling of contemporary and past glaciers

GEOLOGY

Most research is carried out in the New Zealand region, but research also takes place in Antarctica, Australia, Asia, North America and the Pacific islands.

Research areas include (but are not limited to) the following:

- Climate and sea level changes during the past several million years
- The history of glaciations in New Zealand and Antarctica
- The deformation of New Zealand and its plate boundary zone over the last few million years
- Neotectonics, the study of active faulting, and related landscape processes
- Mountain building, deep crustal and mantle structure, and crustal metamorphic processes in the Southern Alps, North Island, and southeast Papua New Guinea
- Volcanology and magma genesis in the central North Island, Afro-Arabia and North Atlantic (Greenland and Iceland)
- History of sedimentation onshore and offshore of New Zealand and Antarctica, and its relationship to plate tectonics, climate change, and petroleum generation
- Pacific Island sediment and resource studies
- Palaeontology and micropaleontology
- Development of novel geochemical and isotopic analytical techniques used in the earth and environmental sciences

Formation of the solar system and the accretion and differentiation of the rocky planets through study of meteorites

GEOPHYSICS

Research equipment and supervision in a wide range of geophysical topics are available for MSc and PhD candidates enrolled in the Institute. We make use of our Wellington location to engage in joint research programmes with Crown Research Institutes (CRI) and the Meteorological Service, and supervision of projects is often shared with staff from the CRI's or the Meteorological Service. In the past decade, several large geophysical projects have been undertaken as joint collaborations with colleagues from US universities and funding being shared between the two countries.

Research is currently in progress in the following areas:

- Earthquake seismology, volcano seismology, fault mechanics, seismogenesis, seismic hazard, and seismic studies of Earth structure
  Martha Savage, Euan Smith, Tim Stern, John Townend
- Physical meteorology, including the use of mesoscale models, precipitation forecast verification satellite imagery and animation techniques
  Jim McGregor
- Palaeomagnetism and geomagnetism, including the determination of the historical geomagnetic field from lake sediment cores
  Malcolm Ingham, Gillian Turner
- Structural and tectonic studies, including the use of deep seismics, magneto-tellurics, gravity, resistivity and heat flow
  All staff
- Plate tectonics and crustal and mantle dynamics, including modelling the plate motion and satellite geodesy
  Martha Savage, Euan Smith, Tim Stern, John Townend

Research seminars, arranged jointly with the GNS Science, Avalon, Lower Hutt, are held monthly and lunch-time colloquia with CRI and Meteorological Service staff provide an opportunity for less formal discussions.

GENERAL INFORMATION

Students are encouraged to view the websites for current information.

POSTGRADUATE RESEARCH SUPERVISION

Academic Board requires all supervisors to provide six-monthly written reports on students enrolled in Master's by thesis and PhD courses. These reports are expected to identify what has been achieved, outline agreed timetables for future work and identify any problems with a student's performance that require to be rectified. Copies of the formal written reports are provided to the student and the School's Postgraduate Coordinator, and put on file in the Faculty Student Administration Office.

Theses are prepared and written in close consultation with a staff member who acts as supervisor. Research students are expected to participate in and contribute to research-in-progress seminars organised from time to time by the School.

FUNDING

The Research Funding Guide is published by the University's Research Policy Office and is available on the University website at
www.victoria.ac.nz/home/publications/research_funding_guide.pdf

The Postgraduate Students' Association has information on StudyLink funding.
www.victoria.ac.nz/pgsa

POSTGRADUATE SCHOLARSHIPS, PRIZES AND GRANTS

Students should check out the University's Prizes and Scholarships database, accessible at:
www.victoria.ac.nz/scholarships

Faculty Research Grants and Summer Scholarships may also be available.
margot.neas@vuw.ac.nz: Contact Margot Neas for more information
www.victoria.ac.nz/science/study/summer-scholarships.aspx: Summer scholarships

POSTGRADUATE STUDENTS' ASSOCIATION

www.victoria.ac.nz/pgsa: Provides representation and other services for all Victoria's postgraduate students.
pgsa-members-subscribe@vuw.ac.nz: Subscribe to the PGSA email list

VICTORIA OVERSEAS EXCHANGE (VIC OE)

Students studying course-taught postgraduate studies are able to participate in an exchange, however not all of our partner universities are open to postgraduate students – please talk to the Student Exchange Office about which universities will be open to you.
www.victoria.ac.nz/exchange/

STUDENT SUPPORT SERVICES

Student Services provides a range of services to all students to help you make the most of your time at university. If you have an issue, need guidance to get through your studies, help is available.

www.victoria.ac.nz/home/viclife/studentservice/default.aspx

STUDENT AND ACADEMIC SERVICES - FACULTY OF SCIENCE

Te Wāhanga Pūtaiao

Address: Level 1, Cotton Building
Phone: 04-463 5101
Email: science-faculty@vuw.ac.nz
Web: www.victoria.ac.nz/science
Hours: 8.30 am – 5 pm Monday, Wednesday, Thursday, Friday
9.30 am – 5pm Tuesday

At the Faculty of Science Student Administration Office **student advisers** can help with admission requirements, degree planning, changing courses, transfer of credit from other tertiary institutions, and anything else that may crop up during your time at Vic. They also deal with other aspects of student administration such as enrolment, exams organisation and the maintenance of student records.

The advisers support students throughout their study. To ensure you get good continuity of personal service, advisers manage a particular group of students, identified by the first letter of your surname:

Area	Student Advisor	Email	Contact
A-H	Patricia Stein	patricia.stein@vuw.ac.nz	04-463 5982
I-Q	Rachel Zhang	rachel.zhang@vuw.ac.nz	04-463 5983
R-Z	Janelle Parry	janelle.parry@vuw.ac.nz	04-463 5981

Johan Barnard	Manager, Student and Academic Services	Tel: 04-463 5980
Shona de Sain	Associate Dean (Students)	Tel: 04-463 5092

TE RŌPŪ ĀWHINA

Address: Cotton Building, Kelburn Parade, Room 148,
Phone: 04-463 5987
Email: teropuawhina@gmail.com
Web: www.victoria.ac.nz/science/awhina

Te Rōpū Āwhina whānau in the Faculties of Science, Engineering and Architecture and Design at Victoria University of Wellington was established in 1999. Āwhina is about people and collective success. The kaupapa of Āwhina is to produce Māori and Pacific science, engineering, architecture and design professionals to contribute to Māori and Pacific community and leadership development. Anyone who assists the building of Āwhina is part of the whānau.