
DEPARTMENT OF ENVIRONMENTAL AND GEOGRAPHICAL SCIENCE

The Department is housed in the Shell Environment & Geographical Science Building, South Lane
Telephone (021) 650-2874 Fax (021) 650-3791

The Departmental abbreviation for Environmental & Geographical Science is EGS.

Professor and Head of Department:

M E Meadows, BSc (Hons) *Sussex* PhD *Cantab* FSSAG

Shell Professor of Environmental Studies:

R F Fuggle, BSc (Hons) UED *Natal* MSc *Louisiana* PhD *McGill*

Professor:

B C Hewitson, BSc *Cape Town* MSc PhD *Penn State*

Honorary Professor:

J Crush, MA *Cantab* MA *Laurier* PhD *Queens*

Emeritus Professor:

R J Davies, MSc *Rhodes* PhD *London* FSSAG

Associate Professor:

S M Parnell, MA PhD *Witwatersrand*

Senior Lecturers:

N Dewar, MA *MRCP* PhD *Cape Town* Dip Ed *Oxon*

S E Oldfield, BA (Hons) *Syracuse* MA PhD *Minnesota*

M F Ramutsindela, MA *UNIN* PhD *London*

Lecturers:

S E Butcher, BSc (Hons) *Stell* MSc *Cape Town*

R C Hill, BSc (Eng) *Cape Town* Pr Eng

K J Winter, BA (Hons) *Cape Town* MA *London*

Administrative Assistant:

S Adams

Senior Secretary:

A Innes-Ravens

Librarian:

S Reddy, BA PGDipLIS MPhil (Adult Educ) *Cape Town*

Laboratory Departmental Assistant:

S Hess

Library Assistant:

T George

ENVIRONMENTAL EVALUATION UNIT

Co-Directors:

R F Fuggle, BSc (Hons) UED *Natal* MSc *Louisiana* PhD *McGill*

M R Sowman, MSc PhD *Cape Town*

Project Manager:

J A Bodenstein, MA *Cape Town*

Short Course Co-ordinator:

L O'Neill

Consultants:

P Cardosa, BSc (Hons) MSc *Cape Town*

M Hauck, MA (Criminology) *Cape Town*

R Hector-Kannemeyer, BA (Hons) *UWC*

M January, BSc (Hons) *Cape Town*

L Kruger, MSc *Cape Town*

S Rippon, MPhil *Cape Town*

V Zenani, BSocSci (Hons) *Cape Town* Dip Transport Economics *RAU*

Interns:

K Foster, BSc (Hons) *Cape Town* MSc *Sydney*

A Mistri, BSocSci (Hons) *UND*

Office Manager:

S Hassiem

Secretary:

F Hartley

DISASTER MITIGATION FOR SUSTAINABLE LIVELIHOODS PROGRAMME (DiMP)

Co-ordinator:

A Holloway, MA *Washington* DrPH *UCLA*

Risk Reduction Research Co-ordinator:

H MacGregor, BA(Hons) *Cape Town*

Project Administrator:

S Prime

RESEARCH IN ENVIRONMENTAL AND GEOGRAPHICAL SCIENCE

Research in Environmental and Geographical Science embraces a variety of topics that are listed below. More detailed information can be obtained by writing to the Department of Environmental and Geographical Science or by consulting the departmental website, www.egs.uct.ac.za.

The Department undertakes research into numerous aspects of the environment, but is particularly involved in studies of environmental change and human-environment interactions. There is an active graduate programme. An 18-month Master's degree in Environmental Management is organised and taught within the Department, and research for higher degrees is also supervised in the more traditional way. There are postgraduate programmes in Environmental & Geographical Science and Disaster Risk Science by coursework and dissertation.

Of major interest is the identification and evaluation of environmental problems, along with the assessment of environmental impacts. The Environmental Evaluation Unit of the Department is active in projects which involve assessing the impact of development projects on the biophysical and social environment.

An area of growing concern relates to the increasing impact of natural and other threats. The Disaster Mitigation for Sustainable Livelihoods Programme (DiMP) focuses its teaching, research and policy advocacy efforts on promoting disaster mitigation as a key component of sustainable development.

The problem of urbanization in Africa provides a focus for staff engaged in an analysis of the process in both contemporary and historical contexts. Biogeographical research is also pursued by staff and research students. The ways in which environmental change and human activities have shaped the landscape and vegetation patterns of southern Africa are interpreted through palaeoecological and geomorphological studies. The Department houses a large reference collection of pollen slides and photographs which is used in reconstructing former vegetation types. Research in climatology focuses on Southern Hemisphere climate variability, regional implications of global climate change, climate modelling, precipitation controls, satellite climatology, and mesoscale meteorology.

Undergraduate Courses

Field work

All students attending courses in Environmental & Geographical Science are required to take part in field work arranged during the year.

First-Year Courses

ERT100F INTRODUCTION TO EARTH & ENVIRONMENTAL SCIENCES 100

See course details under the Department of Geological Sciences.

EGS102S HUMAN GEOGRAPHY

Course co-ordinator(s): Mrs S Butcher and Dr R Ramutsindela

Entrance requirements: Matric Geography on the Higher Grade, or ERT100F

Course outline:

The course comprises an introduction to global systems of human organisations, including economic, social, political and cultural environments.

Period

Mon Tue Wed Thu Fri

Lectures: 2 2 2 2 2

Practicals: One practical per week, Monday or Tuesday or Thursday, 14h00-17h00.

DP requirements: Attendance and satisfactory completion of practical assignments.

Examination requirements: Essays, tests, practical assignments and tutorial work count 40%; one 3-hour theory paper written in November counts 45% (subminimum of 40% required), one 3-hour practical paper written in November counts 15%.

Second-Year Courses

EGS210F ENVIRONMENTAL PROBLEMS

Course co-ordinator(s): Mr K J Winter

Entrance requirements: ERT100F (or ERT102S) and EGS102S

Course outline:

The course provides an analytical and interdisciplinary perspective of environmental issues and problems at a global, regional and local scale. Key themes of resources and resource utilisation, sustainability, climate change, disaster risk, population dynamics and human response characterise the content. The use of information technology and analytical techniques provide the skills component of the course.

Period

Mon Tue Wed Thu Fri

Lectures: 5 5 5 5 5

Practicals: One practical per week, Thursday or Friday, 14h00-17h00.

DP requirements: Satisfactory completion of practicals and all written assignments, including essays and class tests.

Examination requirements: Essays, tests, practical assignments and tutorial work count 40%; one 3-hour theory paper written in June counts 60% (subminimum of 40% required).

EGS211S CITIES OF THE SOUTH

Course co-ordinator(s): Dr S Oldfield

Entrance requirements: ERT100F (or ERT102S or EGS102S) (or Social Science Foundation course and equivalent of at least two other first-year humanities full-year courses).

Course outline:

The course examines the rapidly growing urban centres of the developing world. The international urban context is set against core arguments drawn from political, social and cultural geography.

Period

Mon Tue Wed Thu Fri

Lectures: 4 4 4 4

Tutorials: One tutorial per week, Friday, 4th period.

Practicals: One practical per week, Thursday, 14h00-17h00.

DP requirements: Satisfactory completion of practicals and all written assignments, including essays and class tests.

Examination requirements: Essays, tests and practical assignments count 50%; one 3-hour theory paper written in November counts 50% (subminimum of 40% required).

EGS212S PHYSICAL ENVIRONMENTAL PROCESSES**Course co-ordinator(s):** To be appointed**Entrance requirements:** ERT100F (or ERT102S)**Course outline:**

The course examines fundamental elements of the atmospheric, geomorphological, hydrological and biotic systems, how they operate in an integrated way, especially at regional and local scales, and how they may be impacted on by people. Practical work focuses on developing relevant skills, including quantitative data analysis. Applied aspects of these processes and patterns are explored in which the environment is viewed in the context of resources and various environmental issues (eg. geohazards, extreme climate and weather events, fire, aliens, floods, air and water pollution) are introduced and the focus shifts to the prospects for their appropriate control and management. Case studies are drawn mainly from the SW Cape region.

Period**Mon Tue Wed Thu Fri****Lectures:** 5 5 5 5 5**Practicals:** One practical per week, Friday, 14h00-17h00.**DP requirements:** Satisfactory completion of practicals and all written assignments, including projects and class tests.**Examination requirements:** Project work, tests and practical assignments count 40%; one 3-hour theory paper written in November counts 60% (subminimum of 40% required).

Third-Year Courses**EGS312S SYNOPTIC CLIMATOLOGY****Course co-ordinator(s):** Professor B C Hewitson**Entrance requirements:** ERT100F (or ERT102S) or any Mathematics first-year course or any Physics first-year course.**Course outline:**

Atmospheric energy balance; winds and circulations; clouds and cloud formation; thermodynamics; rainfall and weather systems in the tropics and midlatitudes; general circulation of the atmosphere; South African weather and climate; droughts and floods.

Period**Mon Tue Wed Thu Fri****Lectures:** 1 1 1 1 1**Practicals:** One practical per week, Tuesday or Wednesday, 14h00-17h00.**DP requirements:** Satisfactory completion of practicals and all written assignments, including essays, project reports and class tests. Attendance at a residential field camp during a University vacation is compulsory.**Examination requirements:** Essays and tests count 20%; project reports and practicals count 20%; one 3-hour written examination in November counts 60% (subminimum of 40% required).

EGS313F ENVIRONMENTAL ANALYSIS**Course co-ordinator(s):** Mrs S E Butcher, Professor R F Fuggle**Entrance requirements:** EGS210F and either EGS212S or EGS211S**Course outline:**

The course deals with the fundamental methods in the collection, organisation, presentation, analysis and interpretation of a wide range of environmental data. The focus is on practical skills to enable the student to better understand observations and measurements associated with the study of the natural and built environment.

Period

	Mon	Tue	Wed	Thu	Fri
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Lectures:	5	5	5	5	5
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Practicals: Two practicals per week, Wednesday and Friday, 14h00-17h00.

DP requirements: Satisfactory completion of practicals and all written assignments, including essays, project reports and class tests.

Examination requirements: Essays, tests and practical assignments count 30%; project reports count 30%; one 3-hour written examination in June counts 40% (subminimum of 45% required).

EGS314S ENVIRONMENTAL CHANGE

Course co-ordinator(s): Professor M E Meadows

Entrance requirements: EGS210F or EGS212S

Course outline:

The course deals with environmental change, particularly as manifested in the Quaternary period, and its impacts on biogeographical and geomorphological processes. An attempt is made to view the dramatic environmental changes of the recent past in the context of long-term changes. The lessons of the past in terms of predicting and managing environmental change are evaluated.

Period

	Mon	Tue	Wed	Thu	Fri
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Lectures:	5	5	5	5	5
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Practicals: One practical per week, Wednesday, 14h00-17h00.

DP requirements: Satisfactory completion of practicals and all written assignments, including essays, project reports and class tests. Attendance at a residential field camp during a University vacation is compulsory.

Examination requirements: Essays, tests, project reports and practicals count 40%; one 3-hour theory examination in November counts 45% (subminimum of 40% required); one 2-hour practical examination in November counts 15%.

EGS315S URBAN GEOGRAPHY

Course co-ordinator(s): Dr N Dewar

Entrance requirements: EGS210F or EGS211S

Course outline:

The course has two parts. In the first part, recent theoretical debates on cities drawn from the international urban studies literature are explored and its relevance to the South African city is debated. In the second section, the locational determinants of urban space are analysed to explain the daily functioning of the urban system.

Period

	Mon	Tue	Wed	Thu	Fri
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Lectures:	M	M	M	M	
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Tutorials: One tutorial per week, Monday, by arrangement.

Practicals: One practical per week, Wednesday, 14h00-17h00.

DP requirements: Satisfactory completion of practicals and all written assignments, including essays, project reports and class tests. Attendance at a residential field camp during a University vacation is compulsory.

Examination requirements: Essays and tests count 50%; two 3-hour written examinations in November count 50% (subminimum of 40% required).

EGS316F POPULATION DYNAMICS, MEASUREMENT AND PROCESSES I

NOTE: This course is offered by Centre for Actuarial Research (CARE), 10 University Avenue.

Course co-ordinator(s): Dr T Moultrie

Entrance requirements: MAM100W, STA106H (or STA105H) and a full second year course (or equivalent) in Mathematics, Statistics, Economics or Environmental and Geographical Science.

Course outline:

This course, together with its successor in the second semester (EGS391S), teaches the basic skills of demographic data analysis and description.

Topics covered in EGS390F include:

Global and regional population change and growth; age-and sex composition of populations; standardisation; simple measurement of fertility, mortality, nuptiality and migration; sources of demographic data; the construction, interpretation, and uses of life tables; stationary populations; basic population projections. Emphasis is placed on learning how to solve practical demographic problems.

Period

Mon Tue Wed Thu Fri

Lectures: 4 4 4 4

Tutorials: One tutorial per week, Friday, 6th and 7th period.

DP requirements: Students must submit all tutorials and write all tests, and obtain a subminimum of 35% for the coursework component. A subminimum of 50% for the examination is required to pass the course.

Examination requirements: Essays and tests count 40%; one 3-hour written examination in June counts 60%.

EGS317S POPULATION DYNAMICS, MEASUREMENT AND PROCESSES II

NOTE: This course is offered by Centre for Actuarial Research (CARE), 10 University Avenue.

Course co-ordinator(s): Dr T Moultrie

Entrance requirements: EGS390F.

Course outline:

This course develops and extends the material presented in EGS390F, and relaxes many of the simplifying assumptions made in the earlier course.

Topics covered in EGS391S include:

Further considerations on sources, uses and validation of demographic data including measures of data quality; the force of mortality; stable population theory; multiple-decrement life tables; survival analysis; period vs cohort measures of fertility; proximate determinants of fertility and child mortality; analysis of birth intervals and parity progression.

Period

Mon Tue Wed Thu Fri

Lectures: 4 4 4 4

Tutorials: One tutorial per week, Friday, 6th and 7th period.

DP requirements: Students must submit a research project as well as all tutorials and write all tests, and obtain a subminimum of 35% for the coursework component. A subminimum of 50% for the examination is required to pass the course.

Examination requirements: Essays and tests count 20%; research project report counts 30%; one 3-hour written examination in November counts 50%.

EGS318F INTRODUCTION TO POPULATION STUDIES

NOTE: This course is offered by Centre for Actuarial Research (CARE), 10 University Avenue.

Course co-ordinator(s): Dr R Marindo

Entrance requirements: EGS211S or SOC219F.

Course outline:

This course aims to enable the student to describe and understand the foundational material of population studies. The course will cover the size, distribution and growth of the populations of the main developing regions and countries; levels, trends and differentials in fertility, mortality and

marriage in developing countries; the causes of mortality decline in the developing world; synergistic interactions associated with infectious diseases and child malnutrition; the social and economic consequences of rapid population growth; possible costs and benefits of having children for peasant couples; other factors affecting fertility. Additionally, the course will cover topics such as the spread of HIV/AIDS and its demographic implications; patterns and trends in migration and urbanisation in developing countries as well as the social, biological and economic influences on population growth rates, especially the role of famine, disease and war; the demographic and health transitions; the changing characteristics of the family; global trends in population ageing and their social and economic consequences for the elderly; theories and trends in migration; urbanisation.

Period

Mon Tue Wed Thu Fri

Lectures: 3 3 3 3

Tutorials: One tutorial per week, Friday, 3rd period.

DP requirements: Students must submit and attend all tutorials and submit a long essay of not less than 4000 words, and obtain a subminimum of 35% for the coursework component. A subminimum of 50% for the examination is required to pass the course.

Examination requirements: Essays and tests count 40%; one 3-hour written examination in June counts 60%.

EGS319S POPULATION AND DEVELOPMENT

NOTE: This course is offered by Centre for Actuarial Research (CARe), 10 University Avenue.

Course co-ordinator(s): Dr R Marindo

Entrance requirements: EGS211S or SOC219F.

Course outline:

Beginning with the work of Thomas Malthus, this course traces the evolution of discourses of population and its relationships with society, economics and politics, through to the work of Paul Ehrlich (The 'population bomb') and the rise of a new consensus on population at the 1994 International Conference of Population and Development. The course critically examines the different analytic approaches to the main interrelationships between population changes and socio-economic development. Drawing on a variety of theoretical and historical experiences to address and explore these interconnections and the principal debates concerning them, the course aims to provide balance between theoretical understanding, knowledge of empirical processes, and implications for policy.

We address Malthusian, anti-Malthusian and neo-Malthusian perspectives on the linkages between population, socio-economic development and the environment, comparing and contrasting contemporary and historical evidence. A great deal of attention is devoted to an assessment of demographic transition theory in both its original and subsequent formulations. The implications of the theory for economic development, urbanisation and socio-structural change are debated.

In addition, we shall consider the role of the state in affecting population outcomes; the role of population policies, family planning programmes and the means and mechanisms of assessing the efficiency and efficacy of population programmes.

Period

Mon Tue Wed Thu Fri

Lectures: 3 3 3 3

Tutorials: One tutorial per week, Friday, 3rd period.

DP requirements: Students must submit and attend all tutorials and submit a long essay of not less than 4000 words, and obtain a subminimum of 35% for the coursework component. A subminimum of 50% for the examination is required to pass the course.

Examination requirements: Essays and tests count 50%; one 3-hour written examination in November counts 50%.

Postgraduate Courses

Ancillary activities

In addition to formal courses, students undertaking postgraduate courses are required to participate fully in other departmental activities of an academic nature. Such activities are weekly seminars on environmental topics addressed by persons prominent in their fields, field camps and field exercises away from Cape Town, and study tours to obtain first-hand exposure to environmental problems and their solutions. Graduate students who, in the opinion of the Head of Department, have not had adequate exposure to undergraduate courses with environmental content may also be required to attend specified courses.

EGS401W BSc (HONS) IN ATMOSPHERIC SCIENCE

Course co-ordinator(s): Professor B C Hewitson

Entrance requirements: As for EGS404W, with the additional requirement of at least a half-course in Mathematics or a full-course in Physics, as well as a senior undergraduate course in climatology or atmospheric science. Experience with computers is highly recommended.

Course outline:

The Atmospheric Science programme provides a 4th year of development for those interested in following a career associated with atmospheric science and climatology, or for progression to research in this area. The focus is on practical skills and the application of theory to the issues related to the climate system. The programme follows the same pattern as EGS404W, with the constraint that three of four course modules must be from the atmospheric options, and the fourth module from one of the honours level physical science options in Environmental & Geographical Science or the Oceanography department. Included in the requirements are a dissertation, two seminar presentations, and course fieldwork. Students will also attend and present at the annual conference of the South African Society for Atmospheric Scientists.

Examination requirements: The examinations will follow the same structure as EGS404W. Not all course options have formal examinations, and a significant portion of the total coursework mark may be based on set project tasks.

EGS404W BSc (HONS) IN ENVIRONMENTAL & GEOGRAPHICAL SCIENCE

Course co-ordinator(s): To be advised

Entrance requirements: A BSc degree or the equivalent with a major in Environmental & Geographical Science or an equivalent major approved by the Head of Department. Qualifications in the following courses are highly recommended: a half course of university level Mathematics; for specialization in Development and Urban Geography, ECO102W or ECO104W (Economics), or SOC101W (Sociology), or POL103W (Political Studies). Intending students must, in addition to submitting an application to the University, complete and return a departmental application form (available from the Departmental Secretary) by 1 November.

Course outline:

Advanced semester courses of lectures, tutorials and seminars, and a research project must be undertaken. The Honours curriculum will include four advanced semester courses. The semester courses include the following fields: Climatology and Atmospheric Science, Contemporary City Issues, Geography of Development, Geography of the Third World City, Geomorphology, Integrated Environmental Management, Disasters and Sustainable Development, Quaternary Palaeoecology. Appropriate honours-level semester courses offered by another department may be permitted with the approval of the Head of Department.

Examination requirements: Courses will be examined at the end of each semester, and the marks combined with project, essay, field work and seminar presentation marks.

EGS408W and EGS511W and EGS521W BSc (HONS)/MPhil IN DISASTER RISK SCIENCE

This programme is structured in the form of a one year Honours degree leading directly to the second year of coursework and research culminating in a Master of Philosophy degree in Disaster Risk Science.

Course co-ordinator(s): Dr A Holloway

Entrance requirements: Students entering the programme must have completed a BSc degree in Environmental & Geographical Science or a related discipline. Individual specialist modules may carry additional prerequisites. Students proceeding to the MPhil component of the programme must satisfy the coursework, examination and project requirements of the BSc (Hons) degree in Disaster Risk Science. In addition to submitting an application to the University, prospective candidates must complete an application form available from the department.

Course outline:

The programme aims to provide students with an integrated understanding of disaster risk and its implications for sustainable development in southern Africa, with a specific focus on South Africa. The course contextualises disaster risk as an outcome of the interplay between human and natural factors. Moreover, it assumes an interdisciplinary perspective on disasters, taking into consideration both biophysical elements (hazards), as well as social and economic forces that influence disaster vulnerability and resilience. In the first (Honours) year of study, students select four coursework modules from a range of core courses and options, including an introduction to disaster risk science, foundation courses in research methods, earth systems science and settlement geography, as well as a disaster risk research Honours project. It is followed by a second (MPhil) year of in-depth study in disaster risk science, students selecting four advanced course options in areas such as food/livelihood security, community-based risk reduction, actuarial science and public health. Relevant courses offered by other Faculties at appropriate academic levels may be counted as credits towards both Honours and MPhil degrees at the discretion of the course convenor in consultation with the Head of Department. A major Disaster Risk Science research report, completes the MPhil degree.

Examination requirements: All modules are examinable by 3-hour written examination; practicals, essays, projects and other assignments count 40% of the mark in most instances. The research project in the first year counts 20% towards the Honours degree, while the Disaster Risk Research report constitutes 50% of the total marks for the MPhil degree.

ERT401W and ERT500W BSc (HONS)/MSc IN QUATERNARY SCIENCE

This is a one year Honours-level BSc degree programme in Quaternary Science leading directly to a second year of dissertation-based research towards the degree of MSc. Students would have the option of graduating at the end of year 1 or proceeding to the MSc after completion of a research dissertation.

Course co-ordinator(s): To be advised

Entrance requirements: Students entering the programme must have completed an undergraduate degree with a major in Archaeology, Geography, Environmental Science, Geology, Botany, Zoology, Oceanography or other environmentally-related discipline.

Course outline:

The structure of this year is based on a modular system as follows: Quaternary Science core module which includes history and philosophy, fundamentals of earth systems, methods (including dating), quantitative methods, information technology and fieldwork. Four modules chosen from the following list: Dating techniques; Principles of stable light isotopes; Quaternary palaeoecology; Marine geoscience and palaeo-oceanography; Palaeoclimates and environmental reconstruction; Human evolution and palaeoecology; Vegetation and global change; Curation of Quaternary collections. Note: at the discretion of the Programme convenor, students could be allowed to take one of their four modules from any approved Honours module in the Science Faculty. Modules offered subject to availability and demand. In order to facilitate the two exit points, it is suggested

that students initially register for BSc Hons (ERT401W) and then upgrade to MSc (ERT500W) at the end of the first year of study at the discretion of the Programme Convenor. Upgrading would be dependent upon satisfactory completion of all course modules plus the presentation of an acceptable research project proposal. Students who have already completed an Honours degree in a related discipline would be eligible to proceed directly to MSc registration upon submission of an acceptable research proposal.

Examination requirements: 3-hour examination in the case of all modules; practical assignments and essays count 33% of all modules. Research project counts 25% towards BSc (Hons), where appropriate. Satisfactory completion of practical assignments, essays and project proposal required in the case of students proceeding to MSc.

EGS503W MSc IN ENVIRONMENTAL & GEOGRAPHICAL SCIENCE

Following completion of an Honours degree (or equivalent) acceptable to the Head of Department, candidates must undertake an independent research project and submit the results in the form of a dissertation. General rules for this degree may be found in the front of the handbook. In addition to submitting an application to the University, prospective candidates must complete an application form available from the department.

EGS508W and EGS509W MPhil IN ENVIRONMENTAL MANAGEMENT

(by coursework and dissertation)

This MPhil programme is designed for students with diverse backgrounds who have an interest in environmental matters. Environmental problems are interdisciplinary in nature and students with backgrounds in scientific, engineering, economic, educational, social and legal disciplines are encouraged to apply.

Course co-ordinator(s): Mr R C Hill

Entrance requirements: Students must be eligible to pursue an MA, MSc or MPhil degree at UCT, that is, they must hold an Honours degree (or equivalent). In special circumstances graduates who have shown by examination, or publication, or a record of appropriate training, that they have reached a level equivalent to an Honours degree may be admitted.

Applications for admission: Prospective students are advised that, because of the restricted number of places in the Environmental Management programme, only selected students are admitted. It is therefore imperative that intending applicants, in addition to submitting an application to the University, complete the application form available from the Department and submit this before 30 August in the year prior to intended registration. Students must pay a non-refundable deposit of R1000 on acceptance of a place offered.

Course outline:

Prescribed coursework (EGS508W): Students must complete a compulsory programme of seminars and lectures in four clusters of courses: Environmental Management; Skills Development; Society and the Environment; and The Biophysical Environment. Examinations are conducted in June and October of the first year and consist of written examination papers, an interview with the external examiner, and the assessment of field projects, essays and formal seminars. Candidates failing to pass the first-year examinations will not be permitted to proceed to the second year of study.

Journal paper or dissertation (EGS509W): A seven-month research project, consisting of a four-month small group project followed by the preparation of individual journal papers or dissertations, must be completed and submitted for formal examination by internal and external examiners. The research project must demonstrate the application of science to practical issues in environmental planning, impact assessment and management.

EGS510W and EGS520W MSc IN ENVIRONMENTAL & GEOGRAPHICAL SCIENCE

(by coursework and dissertation)

This is an advanced programme of study by coursework and research leading to the degree of

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Master of Science

Course co-ordinator(s): Dr S Oldfield

Entrance requirements: Candidates must have completed a BSc (Hons) degree in Environmental & Geographical Science. Individual specialist modules may carry additional prerequisites. In addition to submitting an application to the University, prospective candidates must complete an application form available from the department.

Course outline:

Students select four modules from a range of advanced courses in Environmental & Geographical Science that have foundations in one or more of the following areas of study: Human Geography, Physical Geography, Atmospheric Science, Environmental Management, Geographical Information Systems. In addition, each student conducts a major research project examined by dissertation. At the discretion of the course convenor, in consultation with the Head of Department, students may count one or two modules from outside the department towards the MSc degree in Environmental & Geographical Science by coursework and dissertation.

Examination requirements: Modules are conventionally examined by three hour written papers in combination with various coursework elements such as essays, projects, practical assignments etc.

EGS603W PhD IN ENVIRONMENTAL & GEOGRAPHICAL SCIENCE

Prospective candidates are referred to the rules for this degree as set out in Book 3, General Rules and Policies. In addition to submitting an application to the University, prospective candidates must complete an application form available from the department.

DEPARTMENT OF GEOLOGICAL SCIENCES

The Department is housed in the Geological Sciences Building, 13 University Avenue
Telephone (021) 650-2931 Fax (021) 650-3783

The Departmental abbreviation for Geological Sciences is GEO.

Chamber of Mines Professor of Geochemistry and Head of Department:

A P le Roex, BSc *Stell* BSc (Hons) PhD *Cape Town*

Philipson-Stow Professor of Mineralogy and Geology:

M J de Wit, BSc (Hons) *Dublin* PhD *Cantab*

Emeritus Professors:

J J Gurney, BSc (Hons) PhD *Cape Town* FRSSAf

W E L Minter, BSc *Cape Town* PhD *Witwatersrand*

Associate Professors:

J S Compton, BA *San Diego* PhD *Harvard*

H R E Frimmel, PhD *Vienna*

C Harris, BA DPhil *Oxon*

D L Reid, MSc *Wellington* PhD *Cape Town*

S H Richardson, BSc (Hons) *Cape Town* PhD *MIT*

Senior Lecturers:

A N Roychoudhury, MSc *Dhanbad* PhD *Georgia Tech*

G C Smith, BA (Hons) MA *Cantab*

M Tredoux, BSc *Stell* BSc (Hons) *Cape Town* PhD *Witwatersrand*

Lecturers:

M Smith, BSc (Hons) *Witwatersrand* MSc *Cape Town*

G Viola, *Laurea Padova* PhD *Zurich*

Senior Research Officer:

J Rogers, MSc PhD *Cape Town*

Honorary Research Associates:

H Annegarn, BSc (Hons) PhD *Witwatersrand*

H C Klinger, MSc *Stell* PhD *Tubingen*

R M Smith, MSc *Witwatersrand* PhD *Cape Town*

R Zartman, MS PhD *Caltec*

Principal Scientific Officer:

A Späth, MSc PhD *Cape Town*

Principal Technical Officer:

B A Cairns

Chief Technical Officer:

V Moisey

Senior Technical Officer:

J Harrison

Senior Scientific Officers:

T Davies

S Govender

Scientific Officer:

E Anckar

Administrative Assistant (part-time):

S Whitmore

Senior Secretary:

N Bunga

SAP R/3 Administrator:

J Butler

Assistant Librarian:

L Rabinowitz

Research Assistants:

N Adonis
F Rawoot

Technical Assistants:

R Oliver
P Sieas
D Wilson

Departmental Assistants:

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RESEARCH IN GEOLOGICAL SCIENCES

Research in Geological Sciences embraces a variety of topics that are listed below. More detailed information can be obtained by writing to the Department of Geological Sciences.

The Department has research strengths in geochemistry, structural geology and tectonics, igneous and metamorphic petrology, sedimentology, marine geology, economic geology and petroleum geophysics. General research interests include: global tectonics and geodynamics with emphasis on Gondwana geology; structural geology; oceanic and continental igneous processes and the geochemical evolution of the underlying mantle; kimberlites and the genesis of diamonds; open and closed system behaviour during metamorphism and related ore genesis; economic geology with emphasis on base metal deposits; environmental geochemistry; sedimentology, sedimentary geochemistry, and sedimentary processes; chemical stratigraphy and crisis in the geological record; marine sedimentology and geophysics. The Department is well equipped for analytical studies with X-ray fluorescence, electron microprobe, ion chromatograph, and X-ray diffraction equipment, a solution and laser ablation ICP-MS facility, a solid source mass spectrometer and access to a gas-source mass spectrometer for oxygen and carbon stable isotope measurements. The Department is also well equipped for structural and tectonic analysis and seismic interpretation, with microcomputer laboratories and GIS work stations.

Undergraduate Courses

Field excursions:

All students attending courses in Geology are required to take part in the field excursions arranged for them during the year.

Note: Supplementary examinations are not normally granted to students for senior courses in Geology.

First-Year Courses

ERT100F INTRODUCTION TO EARTH AND ENVIRONMENTAL SCIENCES 100

This course is presented jointly by the Departments of Archaeology, Environmental and Geographical Science and Geological Sciences.

Course co-ordinator(s): Associate Professor C Harris

Entrance requirements: Matric Physical Science or Biology or Geography on Higher Grade, or an 'A' on Standard Grade. Preference will be given to students registered in the Science Faculty.

Course outline:

Structure and dynamics of the Earth; stratigraphy and geological history; climatology; surface processes and evolution of landscapes; biogeography; humans and the environment.

Period

Mon Tue Wed Thu Fri

Lectures: 2 2 2 2 2

Practicals: One practical per week, Monday or Tuesday or Thursday or Friday, 14h00-17h00.

Fieldwork: Students are required to attend two 1-day excursions in the Cape Peninsula.

DP requirements: An average of 30% on all marked classwork and tests.

Examination requirements: Marked class work counts 24%; marked class tests count 16%; one 3-hour theory examination written in June counts 60%. A subminimum of 40% is required in the theory examination paper.

Note: Supplementary examinations will be written in November.

ERT102S INTRODUCTION TO EARTH AND ENVIRONMENTAL SCIENCES 102

Note: ERT102S is a tutorial-based reinforcement of ERT100F. Credit will not be given for both ERT100F and ERT102S. No supplementary examination will be offered.

Course co-ordinator(s): Dr M Tredoux

Entrance requirements: DP in ERT100F.

Course outline:

As for ERT100F.

Tutorials: One tutorial per week, Friday, 14h00-17h00.

Examination requirements: Marked classwork counts 40%; one 3-hour theory examination written in November counts 45%; one 1-hour practical examination written in November counts 15%. Subminima of 40% are required in practical and theory examination papers.

GEO106S INTRODUCTION TO MINERALS, ROCKS AND STRUCTURE

Course co-ordinator(s): Associate Professor D L Reid

Entrance requirements: A minimum of 45% in ERT100F or ERT102S

Course outline:

Crystals and minerals; Igneous and metamorphic rocks; Structural geology; Mineral deposits and economic geology; Palaeontology.

Period

Mon Tue Wed Thu Fri

Lectures: 5 5 5 5 5

Practicals: One practical per week, Thursday, 14h00-17h00.

Fieldwork: Students are required to attend a one-day excursion in the Cape Peninsula, and a four-day excursion through the southwestern Cape during the September vacation.

DP requirements: An average of 30% in all marked classwork and tests. Compulsory attendance at one tutorial session per week for all students who fail any class test, until such time as a subsequent test is passed.

Examination requirements: Class tests count 15%; field reports count 5%; one 3-hour practical examination written in November counts 35%; one 3-hour theory paper written in November counts 45%. Subminima of 40% are required in practical and theory examination papers.

GEO107S EARTH STEWARDSHIP

Note: This is a cross-disciplinary course intended for students of all faculties. Students who would like to learn more about how the Earth works and how Earth's resources affect our lives and our future socio-economic welfare, are encouraged to attend. Confirm with Department whether to be offered in 2005.

Course co-ordinator(s): Professor M J de Wit

Entrance requirements: None

Course outline:

This course is divided into 3 sections:

1. Creating a habitable planet and analysing how Earth works as a gigantic recycling machine.
2. Managing habitable planet and evaluating Earth as a service industry.
3. Developing new robust contracts between (geo)science and society.

Topics include: Origin of the solar and Earth-Moon systems; geological (deep) time; origin,

structure and history of Earth; introduction of rocks, minerals and soils; Earth systems and the rock cycle, the water cycle, the carbon cycle, the nitrogen cycle; origin and evolution of life and humans. Earth's past punctuated record of extinctions, biodiversity collapses and recoveries; continental drift, plate tectonics and mountain building; snowball Earth and hothouse Earth; Earthquakes, volcanic eruptions, meteorite impacts and other natural disasters; exploring for and exhumation of Earth's resources; greenhouse gases and global warming; economics of exhaustible resources; socio- and political-issues in the geoscience arena; energy needs and resource conflicts in Africa; landscapes and manscapes of Africa.

Period

Mon Tue Wed Thu Fri

Lectures: 5 5 5 5 5

Practicals: By arrangements on the website.

DP requirements: An aggregate of 30% for term assignments, attendance on field trip.

Examination requirements: Term assignments count 40%; a 3-hour November examination counts 60%.

Second-Year Courses

GEO201F MINERALOGY AND CRYSTALLOGRAPHY

Course co-ordinator(s): Associate Professor S H Richardson

Entrance requirements: ERT100F (or ERT102S) and GEO106S, first qualifying course in Chemistry.

Course outline:

Crystallography, crystallographic calculations, and a brief introduction to X-ray crystallography. Crystal optics: the theory and practice of identifying minerals by means of the polarising microscope. Mineralogy: the chemical, physical and optical properties of selected groups of rock-forming minerals. Phase diagrams: interpretation of one, two and simple three component phase diagrams.

Period

Mon Tue Wed Thu Fri

Lectures: 2 2 2 2 2

Practicals: One practical per week, Wednesday, 14h00-17h00.

DP requirements: Attendance at 80% of practicals, and an average of 30% in all marked class work and tests.

Examination requirements: Marked class work, including tests, count 20%; one 3-hour practical examination written in June counts 35%; one 3-hour theory paper written in June counts 45%. Subminima of 40% are required in practical and theory examination.

GEO204S PHYSICAL GEOLOGY

Course co-ordinator(s): Associate Professor C Harris

Entrance requirements: GEO201F

Course outline:

Stratigraphy of South Africa. Transport and deposition of siliciclastic sediment. Sedimentary textures and structures. Siliciclastic, carbonate, evaporitic and other sedimentary rocks. Earthquakes, stress, displacement, and strain. Brittle and ductile deformation. Classification and petrography of igneous rocks; Physical processes in magma chambers. Relationship between chemical and mineralogical composition. Types of metamorphism, metamorphic textures and mineral assemblages.

Period

Mon Tue Wed Thu Fri

Lectures: 2 2 2 2 2

Practicals: One practical per week, Wednesday, 14h00-17h00.

DP requirements: An average of 30% in marked class work, and attendance at 80% of practicals.

Examination requirements: Class tests and practicals count 25%; one 3-hour practical examination written in November counts 30%; one 3-hour theory paper written in November counts 45%. Subminima of 40% are required in practical and theory examination papers.

GEO205X FIELD GEOLOGY AND GEOLOGICAL MAPPING (second-year half course)

Course co-ordinator(s): Professor A P le Roex

Entrance requirements: GEO106S, GEO204S (co-requisite)

Course outline:

This is a field-based course that introduces techniques used to identify, describe and document rocks in the field and for interpreting their inter-relationships, with the view to producing geological maps, stratigraphic logs and structural sections. Techniques covered include: mineralogical and textural descriptions of rocks using a hand-lens; measurement of attitude of bedding using compass and clinometer; measurement, description and interpretation of depositional and deformational structures; stereo plots, interpretation and use of aerial photographs; identifying contact relationships; GPS positioning. Course material is taught over four separate field camps spread over two years of study.

Lectures: None

Practicals: Five afternoons by arrangement.

Fieldwork: Nine days in Laingsburg area, nine days in Northern Cape/southern Namibia, three days in Southwestern Cape, nine days in southern Cape.

DP requirements: Attendance at all field camps.

Examination requirements: Maps and reports count for 70%; three 2-hour practical examinations in June and November count for 30%.

Third-Year Courses

GEO301S STRATIGRAPHY AND ECONOMIC GEOLOGY

Course co-ordinator(s): Professor M J De Wit

Entrance requirements: GEO204S, DP in GEO305F

Course outline:

The principles of stratigraphy with examples drawn from the South African rock record. The methods and procedures involved in dating rocks. The genesis of economic mineral deposits, their microscopic textures, and their valuation and exploitation. Geophysical techniques.

Period

Mon Tue Wed Thu Fri

Lectures: 2 2 2 2 2

Practicals: Two practicals per week, Tuesday and Thursday, 14h00-17h00.

DP requirements: An average of 30% in all marked class work and class tests.

Examination requirements: Practical and tests count 25%; one 3-hour theory examination written in November counts 45%; two 2-hour practical examinations written in November count 30%. Subminima of 40% required in practical and theory examination papers.

GEO305F PETROLOGY AND STRUCTURAL GEOLOGY

Course co-ordinator(s): Professor A P le Roex

Entrance requirements: GEO201F, GEO204S, first qualifying course in Chemistry

Course outline:

Interpreting major and trace element and isotope variations in igneous rocks. Origin and evolution of the major magma series. Thermodynamics, kinetics and chemography of metamorphic reactions.

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Tectonic setting of metamorphic terrains. Principles of interpretations and classification of continental and marine sedimentary environments. Fault related folding, fold and thrust systems, kinematic principles and section balancing. Ductile deformation.

Period

Mon Tue Wed Thu Fri

Lectures: 2 2 2 2 2

Practicals: Two practicals per week, Tuesday and Thursday, 14h00-17h00.

DP requirements: Attendance at 80% of practicals and an average of 30% in all marked class work and tests.

Examination requirements: Class work counts 20%; one 4-hour practical examination written in June counts 30%; one 3-hour theory paper written in June counts 50%. Subminima of 40% required in practical and theory examination papers.

Postgraduate Courses

GEO400W BSc (HONS) IN GEOLOGY

Course co-ordinator(s): Associate Professor H E Frimmel, Professor A P le Roex

Entrance requirements: A BSc degree with a major in Geology, first qualifying courses in Chemistry and Physics (or Applied Mathematics), and Mathematics. The Senate may accept other courses as being equivalent to these and this criterion will be applied when considering Science graduates from other universities. An average of 60% or higher in the four senior semester courses in Geology is the normal prerequisite for admission for Science graduates; industry-based experience will be taken into account.

Course outline:

Students are required to elect one of three streams of study - General Geology, Geochemistry or Petroleum Geology. A selection of compulsory and elective modules are available for each stream, and would normally include the following: Analytical Geochemistry, Applied Geophysics, Petroleum Sedimentology (offered at the University of Stellenbosch), Economic Geology, Igneous Petrology, Isotope Geochemistry, Mantle Petrology, Marine Geochemistry, Marine Geology, Metamorphic Petrology, Palaeontology, Petroleum Geology and Reservoir Engineering (offered at the University of the Western Cape), Sedimentology, Structural Geology. Evolution of the African Plate and Geodata Analysis are compulsory modules for all students. In addition, each student is required to undertake a supervised research project. Choice of optional modules and research project require the approval of the Honours course co-ordinator and Head of Department. All students are required to attend a two week field trip held during the year.

Examination requirements: The compulsory and optional modules will each have an associated examination held in mid-year and towards the end of the Honours year. These examinations will count 55%, practical and assignment work done during the year counts 20%, and the research project 25% towards the final grade. Subminima of 40% are required for overall exam mark and research project.

GEO401W BSc (HONS) IN GEOCHEMISTRY

As for GEO400W above.

GEO500W MSc IN GEOLOGY

General rules for this degree may be found at the front of the handbook.

GEO501F and GEO502W MSc IN ENVIRONMENTAL GEOCHEMISTRY

(by coursework and dissertation)

Course co-ordinator(s): Dr A N Roychoudhury

Entrance requirements: At least a four year degree in Science, Agriculture, or Engineering,