PROGRAMME SPECIFICATION	

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University
3	**Final Award**	MEnv. (Hons)
4	**Programme Title**	Master of Environmental Sciences with Honours in one of four options Agricultural and Environmental Science Ecosystem Management Environmental Geochemistry Clean Technology
5	**UCAS/Programme Code**	F8D4, F8C1, F8F6, F8H8
6	**Programme Accreditation**	none
7	**QAA Subject Benchmark(s)**	Earth Sciences, Environmental Sciences and Environmental Studies, 2007
8	**FHEQ Level**	7
9	**Last updated**	October 2013

10 Programme Aims

1 To recruit students from varied educational backgrounds who wish to study a breadth of natural and social science subjects in an integrated way within a holistic frame to an advanced level.

2 To produce graduates with:

i) an ability to apply an advanced understanding of a range of natural and social sciences pertinent to the study, understanding and management of environmental systems;

ii) an ability to carry out scientific research investigations and an ability to handle information flexibly from a variety of disciplines in an integrated manner;

iii) the necessary key skills and knowledge to gain employment as an environmental scientist or in other fields requiring good investigative and problem-solving skills.

iv) an ability to act autonomously to advance their own skills and knowledge to a high level.

3 To provide a programme of study which provides appropriate knowledge and technical skills base to address the needs of employers and to enable graduates to develop the interdisciplinary background needed for effective careers in research, management and development in the environmental sector.

4 Provide in the later stages specialisation in the specified area of environmental science to enhance professional capability in the chosen field as demonstrated by a major final year individual project.

- *Agricultural and Environmental Science* - advanced interdisciplinary and holistic understanding of the scientific principles and technical skills required to analyse farming systems and the rural environment in relation to soils, ecology and environmental systems and to assess their sustainability in the context of social acceptability and environmental change.

- *Ecosystem Management* - advanced understanding of the range of temperate zone ecosystems and wildlife species, and a critical awareness of contemporary conservation issues and/or insights, much of which is informed by, the forefront of knowledge about how environmental, management and land-use factors influence ecosystems and wildlife species.

- *Environmental Geochemistry* - advanced understanding of environmental biogeochemistry in particular of the low temperature geochemistry of waters, soils and sediments; fundamental role played by micro-organisms; the origins, toxicity and ultimate fates of pollutants and modern techniques for the analysis of environmental materials.
- *Clean Technology*- advanced understanding of the environmental, economic and social issues associated with the operation of industrial processes and the need for and application of cleaner technologies required to implement practical solutions to minimise pollution and resource usage whilst operating a productive and sustainable company.

5 To provide a flexible programme of study which meets the FHEQ at level 6 at the end of Stage 3 and the FHEQ at level 7 at the end of Stage 4 and which takes appropriate account of the Quality Assurance Agency Benchmark Statement for 'Earth Sciences, Environmental Sciences and Environmental Studies

11 Learning Outcome

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas.

Knowledge and Understanding

Students will be introduced to the study of the terrestrial, aquatic and atmospheric environment and human interaction with it. In particular on completing the programme students should have gained and be able to apply their knowledge of:

A1 Fundamental physical and biological processes within global ecosystems and their complexity and inter-relationships
A2 The political, social and economic implications of human interaction with the environment
A3 Human responses to environmental problems at local to global scales including environmental impact assessment and the implications of paradigms of sustainability and sustainable development.
A4 An understanding of legislative and policy frameworks concerned with human interaction with the environment
A5 Measures of biodiversity and strategies for its maintenance at a range of temporal and spatial scales

Teaching and Learning Methods

Throughout the four year programme, the primary mechanism for teaching knowledge and understanding is via lectures supported by case studies. These learning outcomes are also developed through fieldwork and case studies and given currency by the use of outside speakers and other practitioners.

The integrated nature of the global environment (A1, A5) and the structures shaping human interactions with the environment (A2-A4) are introduced and developed in a range of modules at Stages 1 to 3. The application of this knowledge is further developed through fieldwork and site visits. Biodiversity and environmental management (A4-A5) are also addressed by specific modules at Stages 1 to 3. The global focus and issues of sustainable resource use are taken forward in 'Climate and Environmental Change: Present Future and Past' at Stage 2 and 'Ecosystems: Characteristics, Functions and Environmental Change' at Stage 3. The practice of environmental science and environmental impact assessment (A3) is introduced in 'Environmental Science Issues' at Stage 1. The themes are further developed in 'Environmental Practice' at Stage 2 and in 'Sustainability in theory and practice' and 'Environmental Impact Assessment' at Stage 3.

At Stage 4, students on each programme have a tailored curriculum with the particular emphasis and the most appropriate means to deliver the learning outcomes dependent on the programme focus. For example the extension of understanding of legislative and policy frameworks concerned with human interaction with the environment (A4) is a major focus in MEnv (Clean Technology) whereas increased understanding of measures of biodiversity and strategies for its maintenance at range of temporal and spatial scales (A5) is a focus of MEnv (Ecosystem Management).

Students are encouraged to engage in independent reading to support information delivered in lectures and seminars; they are provided with reading lists to guide them. In many Modules, tutorials follow–up on material covered in lectures and support student-student interaction. Students are encouraged to ask questions during lectures. Case-studies and discussion are used to consolidate less objective elements (A2-A3) and encourage reflection on personal values. Field observation, the writing of reports and reflection on collated data and case studies aid the development of understanding. By Stages 3 and 4 students are expected to take responsibility for their own learning and that of the class with an increased proportion of student-led seminars.

Assessment Strategy

Most modules are assessed by a combination of in-course assessment and a written examination taken at the end of the semester in which the module finishes. At Stage 4 much of the teaching takes place in "blocks" with assessment directly associated with each block. A variety of assessment methods are used including assessment of précis, essays, case studies and research reports, oral presentations and posters, unseen examinations and open book examinations. Most work is produced individually but some is team-based. Peer assessment is used both to moderate team marks and to encourage critical appraisal of work and a better understanding of assessment criteria. The methods of assessment, their relative weighting, their links to learning outcomes and their timing appear in every module description.

Intellectual Skills

On completing the programme students should be able to:

B1 Handle data from a variety of disciplines and integrate information to provide interdisciplinary insights
B2 Select and apply a range of methods to solve problems and produce reasoned solutions.
B3 Develop appropriate search strategies and critically appraise primary and secondary data, information and viewpoints to produce a reasoned evaluation.
B4 Relate investigations to prior work and the state-of-the-art in the field and reference sources appropriately.
B5 Interpret and effectively communicate using both quantitative and qualitative data

Teaching and Learning Methods

Encouraging students to consider data in a critical manner and justify their interpretation develops cognitive skills. This is done during tutorials, fieldwork and lectures throughout Stages 1 to 4. Students learn through problem-solving, handling data, and discussion.

From early in Stage 1, 'Environment and Land Resources' and 'Environmental Science Issues' the focus is on understanding rather than learning facts, with an emphasis on problem-solving (B2, B3). This approach, and an emphasis on integrating materials across disciplines (B1), continues particularly in field classes. Subsequently in case studies, students practice production of reasoned arguments. For the student-led seminars in "Sustainability in theory and practice" they are required not only to present a reasoned argument to introduce the topic but also to develop materials to support further class discussion.

Information literacy is integrated, developed and assessed throughout the course with the support of the library and information centre support staff with a 'golden thread' running from 'Developing Skills to Make Sense of Global Challenges: Food Security' through Environmental Science Issues' and 'Environmental Practice' to 'Ecology and Environment Research' (B3, B4). The ability to handle, interpret and communicate quantitative and qualitative data (B5) is developed progressively with specific practice at Stage 1 in 'The Global Environmental System' 'Statistical Methods' and 'Environmental Issues' through to increasingly independent handling of data in 'Environmental Practice', "Ecology and Environmental Research".

At Stage 4, the final MEnv project allows students to practice, develop and consolidate all the intellectual skills developed within the programme with particular application to a topic of relevance to their specific interests. This process is supported by a series of class tutorials as well as student-supervisor meetings.

Assessment Strategy

Intellectual skills are assessed by means of examinations, essays, oral presentations and contributions to discussion, case studies, laboratory and field reports. The ability of students to support their answers with reasoned argument, application and critical analysis and reference to previous studies is a key marking criteria for assessed work at all Stages. The written and oral reports for the MEnv project provide an integrated final assessment of all the intellectual skills developed within the programmes.

Practical Skills

On completing the programme students should be able to:

C1 Collect and record environmental data in the field and laboratory. This will require the application of a range of skills including: planning, organisation, observation and recording.
C2 Select and use appropriate laboratory and field equipment competently and safely within an appropriate risk management framework.
C3 Design research investigations to address clearly stated objectives and to allow formal testing of hypotheses where appropriate.
C4 Collate data, apply statistical analysis and interpret data appropriately to address defined objectives

Teaching and Learning Methods

At stages 1 to 3, data collection and taxonomic skills (C1, C2) are developed through laboratory-based practicals, field visits and field classes. These also reinforce the data handling and experimental design principles (C3, C4) first introduced in lectures.
Students acquire skills (C1-C4) through hands-on practical experience, problem exercises and the group projects in 'Ecology and Environment Research' and 'Research Methods in Environmental Pollution'. Fieldwork becomes progressively less structured beginning with field visits in 'Environment and Land Resources Field Class', through student-led project planning in 'Environmental Science Field Class 2' and 'Ecology and Environment Research'.

At Stage 4, student-led design and management of the final research MEnv project is supported by the development of 'Project Development Management' skills at Stage 3 and 'Quantitative techniques, experimental design and data analysis' at the beginning of Stage 4. The MEnv project allows students to design a major research investigation, select and use appropriate methods and collate and analyse the data. This process is supported by regular student-supervisor meetings.

Assessment Strategy

Assessment is mostly through reports and practical write-ups (C1-C4). Reports have an element of reporting on process as well as results at Stage 1 and 2. As part of the final report for the Environmental Science Field Class 2, students are required to detail their process of scoping and then designing a short field-based project. Laboratory skills are assessed by means of a laboratory reports (in 'Soils in Terrestrial Ecosystems' and a number of other modules). Reports at Stage 3 are required to be in a technical/ consultancy format or presented as outline research papers. The final MEnv project provides an integrated assessment of the practical skills developed within the programmes.

Transferable/Key Skills

A successful student will be able to:

D1 Summarise and communicate in writing and orally in a manner appropriate to the target audience.
D2 Work effectively both independently and as a member of a team.
D3 Plan work and handle logistical constraints,
D4 Reflect on learning experiences, take responsibility for personal learning and professional development.
D5 Use computing and information technology effectively.

Teaching and Learning Methods

Students are encouraged and supported to develop and enhance their key (graduate) skills at all stages of the programme. Communication skills (D1) are developed through tutorials and student-led seminars (which require both written and oral contributions). Varied requirements for assessments reinforce this and give the opportunity to practice directed report writing skills for a range of work-relevant contexts. The 'Blackboard' managed learning environment is used to support learning throughout the programme.

Team-based exercises are used throughout the course and the development of team-working skills supported by reflective tutorials, within 'Environmental Issues' at Stage 1 and 'Environmental Impact Assessment' at Stage 3 (D2). In parallel, effective independent working (D2, D3) is encouraged and supported through the development of individual areas of interest in 'Environmental Issues' and through supported independent working in many other Modules throughout the programme. C&IT skills (D5) are initially developed through 'Developing Skills to Make Sense of Global Challenges: Food Security'. C&IT skills (D5) are developed 'Developing Skills to Make Sense of Global Challenges: Food Security' and then practised through 'Environmental Practice' and the group projects in Stage 3.

Emphasis is placed on effective study habits and time management at the very beginning of the programme with 'Environmental Science Issues' serving to encourage and monitor good practice. Students are encouraged to consider the key skills required of environmental science and to put into place their own development strategy to enable them to deliver such skills before seeking formal employment. At Stage 2 all students are required to take 20 credits of NCL+ linked modules which have been particularly designed to facilitate the development of key skills in work-relevant contexts.

Assessment Strategy

Key skills are assessed through the production of coursework, case studies and the MEnv project. Oral and poster presentations, reports and précis test the ability to communicate in a variety of media and in a manner appropriate to the target audience (D1). The effective use of information sources (D4) is assessed throughout the programme using essays and case studies and, at Stage 3, through the literature review required in 'Ecology and Environmental Research'. Teamwork Skills (D2) are assessed formatively through tutorial debriefs; peer-assessment forms one element of summative assessment for some modules and students are require to evaluate team performance with reference to literature models in the summative assessment for 'Environmental Impact Assessment'. Planning Skills (D3) are summatively assessed in the MEnv project with formative assessment earlier in feedback on core studies (ACE8092 Project Planning and Management) and fieldwork. C&IT skills (D5) are assessed in coursework exercises in 'Environmental Science Issues', subsequently in the production of case studies (e.g. in ''Research Methods in Environmental Pollution' at Stage 3), and especially in the production of the final MEnv project report.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

This is a four year full-time modular programme consisting of 120 credits a year for four years. 10 credits are equivalent to 100 hours of study time (including both contact time and private study). Taught modules vary in valency from 10 to 20 credits.

Stages 1 to 3 are common to all programmes ensuring a firm foundation across the full spectrum of disciplines necessary to practise environmental science.
At Stage 1 modules are compulsory and hence common to all students. These include laboratory and fieldwork, individual and team problem-solving and the study of contemporary issues in environmental management. There is an emphasis on good study practice, with particular modules focusing very much on developing understanding rather than just facts, and the development of C&IT and literature search skills. In Stages 2 and 3 there is a common spine of compulsory modules with a range of optional modules available to all students so that they can develop individual specialisms. Stage 2 includes a choice of Modules specifically to support the development of employability skills. Stage 3 includes three major project-based Modules requiring students to develop their organisational, communication, team working and problem solving skills.

Students may opt to take a placement year between Stages 2 and 3; students are responsible for finding appropriate placement opportunities, however, support is given by programme staff and the careers service. Students may also opt to take up ERASMUS and study abroad opportunities at Stage 2 or 3.

Stage 4 allows students to develop the essential skills and knowledge base achieved by students studying at Level 7 in the chosen specialist area. The students undertake a substantial literature review and project on a topic selected and developed by the students in their specialist area demanding high level organisational, communication and problem-solving skills.

Key features of the programme (including what makes the programme distinctive)

Particular features of the programme are:

- modules unique to the programme at each Stage
- field work modules at each Stage.
- interdisciplinary structure and insights into the study of real-world environmental problems.

At Stages 1 to 3:

- a focus on the rural environment and the interaction of agriculture, ecology and ecosystem services;
- the opportunity to study terrestrial, aquatic and atmospheric environments;
- the opportunity to study environmental law, policy and management;
- the opportunity to engage with local organisations involved in environmental management.

At Stage 4:

- opportunity to develop the essential skills and knowledge base of a specialist area of environmental science
- the opportunity to undertake an individual research project with groups active in environmental research.

Programme regulations (link to on-line version)

http://www.ncl.ac.uk/regulations/programme/

13 Criteria for admission

Admissions policy/selection tools
Students apply to the programme from a range of backgrounds with diverse qualifications. We consider each applicant on an individual basis taking into account information provided on the UCAS application including experience, past academic performance and potential. Students are encouraged to contact us to discuss their position if they require any further details or clarification.

Entry qualifications
A levels: ABB with at least two science subjects from: Mathematics, Chemistry, Biology, Geography, Environmental Science, Psychology and Physics. GCSE Mathematics (minimum grade A) will be required if not offered at a higher level. .

Scottish qualifications: AAABB including at least two science subjects from: Mathematics, Chemistry, Biology, Geography, Environmental Science, Psychology and Physics. Mathematics required at grade 2 Standard Grade (or Intermediate 2 equivalent) if not offered at Higher Grade. Combinations of Highers and Advanced Highers accepted.

International Baccalaureate: Minimum of 35 points with at least one science subject at Higher Level grade 5 or above from: Mathematics, Chemistry, Biology, Geography, Environmental Science, Psychology and Physics. Mathematics or Mathematical Studies at Standard Level grade 4 or above if not offered at Higher Level.

Non-standard Entry Requirements
We welcome students with qualifications other than those listed above, including Irish Leaving Certificate, BTEC and Access to HE Courses with an appropriate level of science/ maths qualification.
Students with combinations of other qualifications may be invited to visit the University before an offer is made. We are pleased to advise anyone interested with regard to choosing an appropriate preparatory course of study.

Level of English Language capability
A score of at least IELTS 6.5 or equivalent is needed if students are not native English speakers.

14 Support for Student Learning

The Student Services portal provides links to key services and other information and is available at: http://www.ncl.ac.uk/students/

Induction
During the first week of the first semester students attend an induction programme. New students are given a general introduction to University life and the University's principal support services and general information about the School and their programme, as described in the Degree Programme Handbook. New and continuing students meet their personal tutors in individual meetings and also are enabled to mix and discuss issues arising for them as groups and individuals. Detailed programme information and the timetable of lectures/practicals/labs/ tutorials/etc is provided during the induction programme.

The International Office offers an additional induction programme for overseas students.

Study skills support
Students learn a range of Personal Transferable Skills within the timetabled programme, including Study Skills, as outlined in the learning outcomes above. Students are given support to develop appropriate approaches to both group and individual projects.

Numeracy support is available through Maths Aid.

Help with academic writing is available from the Writing Centre. Details can be obtained from Alicia.Cresswell@ncl.ac.uk

Academic support
The initial point of contact for a student is with a lecturer or module leader, or their tutor (see below) for more generic issues. Thereafter the Degree Programme Director or Head of School may be consulted. Issues relating to the programme may be raised at the Staff-Student Committee, and/or at the Board of Studies.

Pastoral support
All students are assigned a personal tutor whose responsibility is to monitor the academic performance and overall well-being of their tutees.

In addition the University offers a range of support services, including the Student Advice Centre, the Counselling and Wellbeing team, the Mature Student Support Officer, and a Childcare Support Officer.

Support for students with disabilities
The University's Disability Support Service provides help and advice for disabled students at the University - and those thinking of coming to Newcastle. It provides individuals with: advice about the University's facilities, services and the accessibility of campus; details about the technical support available; guidance in study skills and advice on financial support arrangements; a resources room with equipment and software to assist students in their studies.

Learning resources
The University's main learning resources are provided by the Robinson and Walton Libraries (for books, journals, online resources), and Information Systems and Services, which supports campus-wide computing facilities.

All new students whose first language is not English are required to take an English Language Proficiency Test. This is administered by INTO Newcastle University Centre on behalf of Newcastle University. Where appropriate, in-sessional language training can be provided. The INTO Newcastle University Centre houses a range of resources which may be particularly appropriate for those interested in an Erasmus exchange.

15 Methods for evaluating and improving the quality and standards of teaching and learning

Module reviews
All modules are subject to review by student questionnaires which are considered by the Board of Studies. Changes to, or the introduction of new, modules are considered by the Programme Teaching Group and then discussed at the Board of Studies. Student opinion is sought at the Staff-Student Committee and/or the Board of Studies. New modules and major changes to existing modules are subject to approval by the Faculty Teaching and Learning Committee.

Programme reviews
The Board of Studies conducts an Annual Monitoring and Review of the degree programme and reports to Faculty Teaching and Learning Committee.

External Examiner reports
External Examiner reports are considered by the Board of Studies. The Board responds to these reports through Faculty Learning Teaching and Student Experience Committee. External Examiner reports are shared with institutional student representatives, through the Staff-Student Committee.

Student evaluations
All modules, and the degree programme, are subject to review by student questionnaires. Informal student evaluation is also obtained at the Staff-Student Committee, and the Board of Studies. The National Student Survey is sent out every year to final-year undergraduate students, and consists of a set of questions seeking the students' views on the quality of the learning and teaching in their HEIs. Further information is at www.thestudentsurvey.com/ With reference to the outcomes of the NSS and institutional student satisfaction surveys actions are taken at all appropriate levels by the institution.

Mechanisms for gaining student feedback
Feedback is channelled via the Staff-Student Committee and the Board of Studies.

Faculty and University Review Mechanisms
The programme is subject to the University's Internal Subject Review process.

16 Regulation of assessment

Pass mark
The pass mark is 40 for Modules in Stage 1 to 3; and 50 for Modules in Stage 4.

Course requirements
Progression is subject to the University's Undergraduate Progress Regulations and Integrated Masters Examination Conventions.
In summary, students must pass, or be deemed to have passed, 120 credits at each Stage. Limited compensation up to 40 credits and down to a mark of 35 is possible at Stages 1 to 3 and there is one resit opportunity, with certain restrictions.
To continue on the MEnv programme students will be required to gain an average of at least 55 with not more than 20 credits with module marks lower than 50 at both Stages 2 and 3. Failure to meet this threshold will lead to a transfer to the BSc with Honours in Environmental Science.

Weighting of stages
The marks from Stages 2, 3 and 4 will contribute to the final classification of the degree
The weighting of marks contributing to the degree is 1:2:3 for Stage 2, 3 and 4 respectively

Common Marking Scheme
The University employs a common marking scheme, which is specified in the Integrated Masters Examination Conventions, namely

	Level 7 modules used for degree classification	**Modules below Level 7 used for degree classification**	**Modules not used for degree classification**
<40	Fail	Fail	Failing
40-49	Fail	Third Class	Basic
50-59	Second Class, Second Division	Second Class, Second Division	Good
60-69	Second Class, First Division	Second Class, First Division	Very Good
70+	First Class	First Class	Excellent

Role of the External Examiner
An External Examiner, a distinguished member of the subject community, is appointed by Faculty Learning Teaching and Student Experience Committee, after recommendation from the Board of Studies. The External Examiner is expected to:

- See and approve examination papers
- Moderate examination and coursework marking
- Attend the Board of Examiners
- Report to the University on the standards of the programme

In addition, information relating to the programme is provided in:

The University Prospectus (see http://www.ncl.ac.uk/undergraduate/)

The School Brochure (contact enquiries@ncl.ac.uk)

The University Regulations (see http://www.ncl.ac.uk/regulations/docs

The Degree Programme Handbook.

Please note. This specification provides a concise summary of the main features of the programme and of the learning outcomes that a typical student might reasonably be expected to achieve if she/he takes full advantage of the learning opportunities provided. The accuracy of the information contained is reviewed by the University and may be checked by the Quality Assurance Agency for Higher Education.

ANNEX

Mapping of Intended Learning Outcomes onto Curriculum/Modules (Stage 1 – Stage 3)

The following modules develop the indicated specific Intended Learning Outcomes

Module	**Type**	**A**	**B**	**C**	**D**
Stage 1					
ACE1008	Compulsory	1	3, 4	1	
ACE1010	Compulsory	2	1, 2, 3, 4, 5	1, 2	1, 2, 3
ACE1014	Compulsory	2, 3	1	1	1
ACE1035	Compulsory	2,3	1, 3		1, 3
ACE1049	Compulsory	2, 3, 4			1
ACE1101	Compulsory	1, 2	1, 2, 5		3
ACE1102	Compulsory	1	3, 4	1	1,5
BIO1003	Compulsory	1		1	
BIO1006	Compulsory	1, 3, 5	5	1	2, 5
CEG1702	Compulsory	3	2, 5		5
MAS1401	Compulsory		2, 5	4	
Stage 2					
ACE2014	Compulsory	3, 4	1, 2, 4	4	1, 3, 5
ACE2015	Compulsory	1	2, 3, 4, 5	1, 2, 3, 4	1, 2, 3, 4, 5
ACE2016	Compulsory	1	4, 5	1	1, 2, 3
ACE2052	Compulsory	1	2, 4	2,	
BIO2002	Compulsory	1, 2, 3, 5	4		
GEO2107	Compulsory	1, 2, 5	1, 3, 4		3
ACE2051	Optional	2	3, 4		1, 2, 3, 4
NCL2100	Optional		4		1, 2, 3, 4
ACE1003	Optional	2	4, 5		3
ACE2003	Optional	2, 3	1, 4		2, 3
ACE2029	Optional	1, 2, 4	1, 4	1	3
BIO2009	Optional	1, 5	2, 4	1	3
BIO2018	Optional	3,	2, 4, 5		3
LAW2053	Optional	4	4		3
Stage 3					
ACE3015	Compulsory	1, 2, 3	2, 4, 5	1, 3, 4	1, 2, 3, 5
ACE3042	Compulsory	2, 3	1, 2, 4, 5		1, 2
ACE3070	Compulsory	1, 5	1, 4	1	1
ACE3080	Compulsory	2, 3, 4	1, 3, 4	1, 4	1, 2, 3, 4
ACE3081	Compulsory	1, 5	2, 3, 4	1, 2, 3, 4	1, 2, 3
ACE3082	Compulsory	4	2, 3, 4	3,	1, 3
ACE3013	Optional	3, 4	4		
ACE3016	Optional	2, 4,	4		
ACE3017	Optional	2, 4	1, 4		
ACE3035	Optional	1, 2, 3	1, 3, 4		
ACE3067	Optional	1, 2, 3	1, 4, 5		
BIO3002	Optional	1	4, 5		
BIO3003	Optional	1	2, 4, 5	4	1, 5
BIO3012	Optional	1, 3	4		1
BIO3031	Optional	1	4		1
LAW3015	Optional	4	4		1

Development of specific Intended Learning Outcomes occurs through the following modules (compulsory modules in bold text, optional modules in italic text)

		Stage 1	Stage 2	Stage 3
A1	Fundamental physical and biological processes within global ecosystems and their complexity and inter-relationships	**ACE1008, ACE1101, ACE1102, BIO1003, BIO1006**	**ACE2015, ACE2016**, **ACE2032, ACE2052, BIO2002**, **GEO2107**, *ACE2029, BIO2009*	**ACE3015, ACE3067, ACE3070**, **ACE3081,** *ACE3035, BIO3002, BIO3003, BIO3012, BIO3031*
A2	The political, social and economic implications of human interaction with the environment	**ACE 1014, ACE1035, ACE1010, ACE1049, ACE1101**	**ACE2051, BIO2002**, **GEO2107,** *ACE1003, ACE2003, ACE2029*	**ACE3015, ACE3042**, **ACE3067, ACE3080,** *ACE3016, ACE3017, ACE3035*
A3	Human responses to environmental problems at local to global scales including environmental impact assessment and the implications of paradigms of sustainability and sustainable development.	**ACE1035, ACE1049, BIO1006, CEG1702**	**ACE2014**, **BIO2002**, *ACE2003, BIO2018*	**ACE3015, ACE3042**, **ACE3067, ACE3080,** *ACE3013, ACE3035, BIO3012, MST3021*
A4	An understanding of legislative and policy frameworks concerned with human interaction with the environment	**ACE1009, ACE1049**	**ACE2014**, **LAW2053,** *ACE2029*	**ACE3080**, **ACE3082,** *ACE3013, ACE3016, ACE3017, LAW3015*
A5	Measures of biodiversity and strategies for its maintenance at a range of temporal and spatial scales	**BIO1006**	**BIO2002, GEO2107,** *BIO2009*	**ACE3070, ACE3081,** *ACE3019, BIO3012*
B1.	Handle data from a variety of disciplines and integrate information to provide interdisciplinary insights.	**ACE1010, ACE 1014, ACE1035, ACE1101**	**ACE2014, GEO2107,** *ACE2003, ACE2029*	**ACE3042, ACE3067, ACE3080,** *ACE3017, ACE3035, ACE3070*
B2.	Select and apply a range of methods to solve problems and produce reasoned solutions.	**ACE1010, ACE1101, MAS1401, CEG1702**	**ACE2014, ACE2015**, **ACE2052,** *BIO2009, BIO2018*	**ACE3015, ACE3042, ACE3081, ACE3082,** *BIO3003*
B3.	Develop appropriate search strategies and critically appraise primary and secondary data, information and viewpoints to produce a reasoned evaluation.	**ACE1008, ACE1010, ACE1035, ACE1102**	**ACE2015, ACE2051, GEO2107**	**ACE3080, ACE3081, ACE3082,** *ACE3035*
B4.	Relate investigations to prior work and the state-of-the-art in the field and reference sources appropriately	**ACE1008, ACE1010, ACE1102**	**All, in particular ACE2014, GEO2107,** *ACE2029*	**All, in particular ACE3082, ACE3042, ACE3081**
B5.	Interpret and effectively communicate using both quantitative and qualitative data.	**ACE1010, ACE1101, BIO1006, MAS1401, CEG1702**	**ACE2015, ACE2016,** *ACE1003, BIO2018,*	**ACE3015, ACE3042, ACE3067, ACE3091,** *BIO3002, BIO3003*

C1	Collect and record environmental data in the field and laboratory. This will require the application of a range of skills including: planning, organisation, observation and recording.	**ACE1008, ACE1010, ACE 1014, ACE1102 BIO1003, BIO1006**	**ACE2015, ACE2016,** *ACE2029, BIO2009,*	**ACE3015, ACE3070, ACE3080, ACE3081**
C2	Select and use appropriate laboratory and field equipment competently and safely within an appropriate risk management framework.	**ACE1010**	**ACE2015, ACE2052**	**ACE3015, ACE3081**
C3	Design research investigations to address clearly stated objectives and to allow formal testing of hypotheses where appropriate.		**ACE2014, ACE2015**	**ACE3015, ACE3081, ACE3082**
C4	Collate data, apply statistical analysis and interpret data appropriately to address defined objectives	**MAS1401**	**ACE2014, ACE2015**	**ACE3015, ACE3080, ACE3081,** *BIO3003*
D1	Summarise and communicate in writing and orally in a manner appropriate to the target audience.	**ACE1010, ACE 1014, ACE1035, ACE1049, ACE1102**	**ACE2014, ACE2015, ACE2016, ACE2051, NCL2100,** *ACE2029*	**All, in particular ACE3067, ACE3080, ACE3081, ACE3082**
D2.	Work effectively both independently and as a member of a team.	**ACE1010, BIO1006**	**ACE2015, ACE2016, ACE2051, NCL2100,** *ACE2003*	**ACE3015, ACE3042, ACE3080, ACE3081,**
D3.	Plan work and handle logistical constraints.	**ACE1010, ACE1035, ACE1101**	**All, in particular ACE2015, ACE2051, GEO2107,LAW2053**, **NCL2100,** *BIO2017*	**ACE3015, ACE3080, ACE3081, ACE3082**
D4.	Reflect on learning experiences, take responsibility for personal learning and professional development.	**ACE1009**	**ACE2014, ACE2015, ACE2051, NCL2100**	**ACE3080**
D5.	Use computing and information technology effectively.	**ACE1009, CEG1702**	**ACE2014, ACE2015,** *ACE2029*	**ACE3015,** *BIO3003*

Mapping of Intended Learning Outcomes onto Curriculum/Modules (Stage 4)

The following modules develop the indicated specific Intended Learning Outcomes

Module	**Type**	**A**	**B**	**C**	**D**
Stage 4					
Agriculture & Environmental Science (F8D4)					
ACE8022	Compulsory		1,2,	3,4	5
ACE8028	Compulsory	1,	4,		
ACE8030	Compulsory	5,	2,5,	1,2,3,	1,2,3
ACE8049	Compulsory	1,2,3,5	3,4		
ACE8060	Compulsory	1,3	3,4		
ACE8067	Compulsory	1,3,4	3,4,5		1
ACE8190	Compulsory		1,2,3,4,5	1,2,3,4	1,2,3,4
Ecosystem Management (F8C1)					
ACE8022	Compulsory		1,2,	3,4	5
ACE8028	Compulsory	1,	4,		
ACE8030	Compulsory	5,	2,5,	1,2,3,	1,2,3
ACE8041	Compulsory	1,2,3,5	3,4		
ACE8042	Compulsory	2,3,4,5	3		1
ACE8045	Compulsory		4,5	1,2,4	2
ACE8191	Compulsory		1,2,3,4,5	1,2,3,4	1,2,3,4
Environmental Geochemistry (F8F6)					
ACE8022	Compulsory		1,2,	3,4	5
ACE8192	Compulsory		1,2,3,4,5	1,2,3,4	1,2,3,4
CEG8106	Compulsory	1,2,3,4	5		
CEG8604	Compulsory	1	3		
CEG8605	Compulsory	1	3		1
CEG8606	Compulsory	1,2,3	4		1
CEG8608	Compulsory	1,2,3,4	5		
Clean Technology (F8H8)					
ACE8022	Compulsory		1,2,	3,4	5
ACE8193	Compulsory		1,2,3,4,5	1,2,3,4	1,2,3,4
CME8010	Compulsory	2,4	1,3,4,5	4	1
CME8012	Compulsory	2,4	1,4,5	5	1,2,3
CME8037	Compulsory	3	2		2
CME8038	Compulsory	1,3,4	3		1
CME8019	Optional	2,4			
CME8035	Optional	3	2		
CEG8608	Optional	1,2,3,4	5		

Development of specific Intended Learning Outcomes occurs through the following modules (compulsory modules in bold text, optional modules in italic text)

Stage 4					
		Agricultural & Env. Science (F8D4)	**Ecosystem Management (F8C1)**	**Environmental Geochemistry (F8F6)**	**Clean Technology (F8H8)**
A1	Fundamental physical and biological processes within global ecosystems and their complexity and inter-relationships	**ACE8028 ACE8049 ACE8060 ACE8067**	**ACE8028 ACE8041**	**CEG8604 CEG8605 CEG8606 CEG8608 CEG8106**	**CME8038** *CEG8608*
A2	The political, social and economic implications of human interaction with the environment	**ACE8049**	**ACE8041 ACE8042**	**CEG8106 CEG8606 CEG8608**	**CME8010 CME8012** *CEG8608 CME8019*
A3	Human responses to environmental problems at local to global scales including environmental impact assessment and the implications of paradigms of sustainability and sustainable development.	**ACE8049 ACE8060 ACE8067**	**ACE8041 ACE8042**	**CEG8106 CEG8606 CEG8608**	**CME8037 CME8038** *CME8035 CEG8608*
A4	An understanding of legislative and policy frameworks concerned with human interaction with the environment	**ACE8067**	**ACE8042**	**CEG8106 CEG8608**	**CME8010 CME8012 CME8038** *CEG8608 CME8019*
A5	Measures of biodiversity and strategies for its maintenance at a range of temporal and spatial scales	**ACE8030 ACE8049**	**ACE8030 ACE8041 AC8042**		
B1.	Handle data from a variety of disciplines and integrate information to provide interdisciplinary insights.	**ACE8022 ACE8190**	**ACE8022 ACE8191**	**ACE8022 ACE8192**	**ACE8022 ACE8193 CME8010 CME8012**
B2.	Select and apply a range of methods to solve problems and produce reasoned solutions.	**ACE8022 ACE8030 ACE8190**	**ACE8022 ACE8030 ACE8191**	**ACE8022 ACE8192**	**ACE8022 ACE8193 CME8037** *CME8035*
B3.	Develop appropriate search strategies and critically appraise primary and secondary data, information and viewpoints to produce a reasoned evaluation.	**ACE8049 ACE8060 ACE8067 ACE8190**	**ACE8041 ACE8042 ACE8191**	**ACE8192 CEG8604 CEG8605**	**ACE8193 CME8010 CME8038**
B4.	Relate investigations to prior work and the state-of-the-art in the field and reference sources appropriately	**ACE8028 ACE8049 ACE8060 ACE8067 ACE8190**	**ACE8028 ACE8041 ACE8045 ACE8191**	**ACE8192 CEG8606**	**ACE8193 CME8010 CME8012**
B5.	Interpret and effectively communicate using both quantitative and qualitative	**ACE8030 ACE8067 ACE8190**	**ACE8030 ACE8045 ACE8191**	**ACE8192 CEG8106 CEG8608**	**ACE8193 CME8010 CME8012**

	data.				*CEG8608*

C1	Collect and record environmental data in the field and laboratory. This will require the application of a range of skills including: planning, organisation, observation and recording.	**ACE8030 ACE8190**	**ACE8030 ACE8045 ACE8191**	**ACE8192**	**ACE8193**
C2	Select and use appropriate laboratory and field equipment competently and safely within an appropriate risk management framework.	**ACE8030 ACE8190**	**ACE8030 ACE8045 ACE8191**	**ACE8192**	**ACE8193**
C3	Design research investigations to address clearly stated objectives and to allow formal testing of hypotheses where appropriate.	**ACE8022 ACE8030 ACE8190**	**ACE8022 ACE8030 ACE8191**	**ACE8022 ACE8192**	**ACE8022 ACE8193**
C4	Collate data, apply statistical analysis and interpret data appropriately to address defined objectives	**ACE8022 ACE8190**	**ACE8022 ACE8045 ACE8191**	**ACE8022 ACE8192**	**ACE8022 ACE8193 CME8010 CME8012**
D1	Summarise and communicate in writing and orally in a manner appropriate to the target audience.	**ACE8030 ACE8067 ACE8190**	**ACE8030 ACE8042 ACE8191**	**ACE8192 CEG8605 CEG8606**	**ACE8193 CME8010 CME8012 CME8038**
D2.	Work effectively both independently and as a member of a team.	**ACE8030 ACE8190**	**ACE8030 ACE8045 ACE8191**	**ACE8192**	**ACE8193 CME8012 CME8037**
D3.	Plan work and handle logistical constraints.	**ACE8030 ACE8190**	**ACE3080 ACE8191**	**ACE8192**	**ACE8193 CME8012**
D4.	Reflect on learning experiences, take responsibility for personal learning and professional development.	**ACE8190**	**ACE8191**	**ACE8192**	**ACE8193**
D5.	Use computing and information technology effectively.	**ACE8022**	**ACE8022**	**ACE8022**	**ACE8022**