

Newcastle Programme Specification

1.	Awarding Institution	University of Newcastle upon Tyne
2.	Teaching Institution	University of Newcastle upon Tyne
3.	Final Award	M.Sc.
4.	Programme Title	Industrial Biotechnology
5.	Programme Accredited by	N/A
6.	UCAS Code	N/A
7.	QAA Subject Benchmarking Group(s)	N/A
8.	Date of Production/Revision	10 June 2004

9. Programme Aims:

1. The primary purpose of this programme is to provide biological and environmental science graduates with the advanced conceptual understanding, detailed factual knowledge, and specialised technical skills for them to follow successful careers as scientists in the biotechnology industry. The training given also forms an excellent introduction to microbiology and molecular biology for the students opting to follow a research orientated career path.

Specifically, the course aims to provide an advanced understanding of:

- (i) the scientific principles necessary for an understanding of industrial biotechnology with some emphasis on developing the interface between the biological sciences and bioprocess control;
- (ii) generic practical skills in handling microorganisms, molecular biological techniques and data analysis; and
- (iii) the fundamental role played by microorganisms in the turnover of pollutants and in the search and discovery of commercially significant natural products.

In addition to these academic and technical skills, the course also aims to equip its graduates with a suite of key skills, including the ability to communicate effectively, to employ IT and library resources appropriately, the capacity to prioritise work and to meet deadlines, the ability to work independently and in collaboration with others, and the capacity to use initiative and to solve problems.

2. The qualities and attributes of graduates will be such that they are able to:
 - (i) deal with complex biotechnological issues both systemically and creatively, making sound judgements in the absence of complete data, and to communicate their conclusions clearly to specialists and non-specialists alike;
 - (ii) demonstrate self-direction and originality in tackling and solving problems, and act independently in planning and implementing tasks at a professional level;

- (iii) continue to advance their knowledge and understanding, and to develop new skills to a high level; and will have
 - (iv) the qualities and transferable skills necessary for employment requiring: the exercise of initiative and personal responsibility; decision making in the complex and unpredictable and the independent learning ability required for continuing professional development.
3. Provision will address the needs of employers in both small and large biotechnological concerns, in higher education, and in governmental and non-governmental research institutes. These organisations need suitably trained staff with a specialised interdisciplinary background to implement their research and development programmes. Graduates will be suitable employees because they will have acquired skills and demonstrated proficiency in:
- (i) understanding key concepts and technical procedures that underpin industrial biotechnology;
 - (ii) the use of appropriate information technology;
 - (iii) the presentation and communication of results of a research enquiry in both spoken and written form;
 - (iv) the ability to critically review and assess scientific research reports and papers relevant to their area of expertise.

The programme will also enable students to meet the Masters level (M, level 4) of the QAA framework for higher education qualifications for England, Wales and Northern Ireland.

10. **Intended Learning Outcomes, Teaching and Learning Strategies and Methods, Assessment Strategies and Methods**

A. **Knowledge and Understanding**

- A1. An advanced knowledge and understanding of the concepts and practices that underpin biotechnology, notably microbial technology.
- A2. An understanding of the role of microbial diversity in the search and discovery of bioactive compounds.
- A3. An understanding of fermentation, process control and industrial scale processes.
- A4. An understanding of the role and impact of gene technology in biotechnology.
- A5. An awareness of the social and ethical implications of developments in biotechnology.
- A6. An advanced knowledge and understanding of a range of appropriate optional subjects to suite personal interests and career positioning including: environmental toxicology, integrated pest management and biological control, microbial transformations of organic pollutants and principles of plant disease management.

Teaching Strategy

Specialist knowledge and understanding (A1-A6) are primarily imparted through lectures (A1-A6), practical classes (A1, A3, A4), seminars (A1-A6), computer workshops (A2, A3) and site visits (A3).

Learning Strategy

The understanding of lecture material is encouraged through independent reading (A1-A6) assisted by the provisions of extensive, albeit prioritised reference lists. Such learning is reinforced by formative feedback provided by practical exercises (A1, A3, A4), seminars (A1-A6), computer workshops (A2, A3) and a major research project leading to the M.Sc. thesis (A1-A6), and independent problem solving exercises (A3).

Assessment Strategy

Assessment of foundation modules is entirely by in-course assessed work including practical class exercises (A1, A3, A4), computer-assisted exercises (A1, A3) and problem solving exercises (A3). Assessment of specialist knowledge and understanding is by formal unseen examinations and by coursework exercises that provide a fuller test of student understanding of the relevant literature (A1-A6). Both employ a range of approaches in order to accurately assess student abilities. Written papers include essays, multi-part questions, and a General Paper that is designed to assess the candidate's ability to integrate knowledge from diverse components of the programme. Assessed coursework comprises practical exercises, IT exercises, essays and posters. Some of A1-A6, depending on the topic of the M.Sc. project, are also examined by means of a written M.Sc. thesis and by *viva voce* examination.

B. Subject Specific/Practical Skills

This programme provides opportunities for students to develop and demonstrate:

- B1. Practical experience in the selective isolation and characterisation of industrially significant micro-organisms isolated from soil
- B2. An understanding of the principles, applications and limitations of molecular biological techniques.
- B3. An understanding of the principles and practices of fermentation and process control processes.
- B4. The ability to critically assess the quality of the experimental data generated by these techniques.

Teaching Strategy

Understanding and experience of microbiological and molecular biological techniques used in industrial biotechnology, notably microbial technology, are provided by individual and group based practical classes supplemented by lectures and seminars. More advanced training in some of skills (B1-B4) is provided on an individual basis, during a five month dissertation project in which the student works within a university research team or within an industrial work setting.

Learning Strategies

Independent reading of recommended references is important in understanding how knowledge is applied and techniques used (B1-B3). However, students are encouraged to acquire skills through active participation in project planning, experimental design and data interpretation as part of the coursework covered initially in the foundation modules and later in specialised modules, and finally through participation in data interpretation (B4). Learning is reinforced and further developed as students apply their skills in data collection, analysis, interpretation and presentation in their M.Sc. project and thesis.

Assessment Strategy

Formal examinations (B1, B2, B3) are used to assess some subject specific/practical skills, especially when additional reading reinforces learning. However, most of these skills are assessed by coursework reports and presentations (B1-B4). Some of the skills are further practiced and assessed by means of the M.Sc. thesis and by the *viva voce* examination.

C. Cognitive Skills

The programme provides opportunities for students to develop and demonstrate:

- C1. The ability to critically assess the quality of data generated by the application of microbiological and molecular biological techniques used in industrial biotechnology.
- C2. The ability to present and summarise such data, and to critically appraise its significance, using statistical techniques where appropriate.
- C3. The ability to critically assess the value and limitations of existing information on a given subject.
- C4. The ability to formulate or recognise key hypotheses, to test hypotheses using rational and consistent quantitative or qualitative arguments, and to identify key data which allow such tests to be made.
- C5. The ability to critically assess the value and limitations of new data in relation to existing information on a given subject, to draw logical conclusions, and to identify appropriate avenues for further study.
- C6. The ability to solve problems.

Teaching Strategy

The cognitive skills (C1-C6) are developed initially in the foundation modules through a combination of lectures, practical classes, computer-based exercises, and problem solving exercises. They are progressed in the specialised compulsory modules and in optional specialised modules, there they are applied to specific research issues. The M.Sc project and thesis allow cognitive skills C1-C6 to be applied to a specific research problem or issue guided by individual supervision either in an industrial or university research setting.

Learning Strategy

Students are encouraged to acquire cognitive skills in a variety of ways including the development of a project proposal and peer-group presentation during their IT and presentation skills module, and through coursework and discussion following seminars (C1-

C3). The design and practice of the M.Sc. research project is also important and is particularly useful for further developing most, if not all, of the cognitive skills (C1-C6).

Assessment Strategy

Cognitive skills (C1-C6) are assessed by means of coursework (scientific reports, essays and calculations), and unseen written examinations. Some, or all, of C1-C6 (depending on topic) are also examined by means of the M.Sc. thesis and (at the discretion of the External Examiner) by *viva voce* examination.

D. Key (transferable) skills

The programme provides opportunities for students to develop and demonstrate:

- D1. The ability to communicate by means of well prepared, clear presentations, and concise and grammatically correct written documents.
- D2. The ability to make use of library and other information sources.
- D3. The ability to use IT resources skilfully and appropriately.
- D4. The ability to plan, organise and prioritise work activities in order to meet deadlines.
- D5. The ability to work independently, with initiative, and also in teams.
- D6. The ability to show originality and initiative in tackling and solving problems.

Teaching Strategy

The teaching of transferable skills is an integral part of the whole M.Sc. programme. Verbal presentational skills and dealing with critical feedback are developed initially in a purpose-designed foundation module and further encouraged and developed in seminars. All skills (D1-D6) are important in planning, carrying out, presenting and being examined in the research project and M.Sc. thesis. Development of project proposals (D1, D2, D4, D5) and independent problem solving (D6) teach students about the importance of communication skills, information sources and originality and independence in the implementation of their knowledge.

Learning Strategy

A wide range of methods is used to reinforce the teaching of key skills and aid understanding. There is some recommended reading, but most of the key skills are developed through practical classes (D1-D6), seminars (D1), problem solving exercises (D3, D6), the research project (D1-D5) and by communicating information in short oral presentations (D1, D3).

Assessment Strategy

Key skills are not independently assessed. However, communication (D1), library (D2), and IT skills (D3), and the ability to meet deadlines (D4) are indirectly assessed by coursework (scientific/technical reports, posters and essays). All key skills (D1-D6) are examined by means of a dissertation and presentation, and possibly (at the discretion of the External Examiner) by *viva voce* examination.

11. Programme Features, Curriculum and Structure

(i) Programme Features

This is a one year, fulltime modular Masters degree programme. It conforms to the modular structure of other M.Sc. programmes taught in the School of Biology, and the School of Agriculture, Food and Rural Development over three 'Phases' (See Figure 1), and is delivered through inter-school collaboration with other Schools, including Civil Engineering and Geosciences. It consists of two parts: a *taught component*, which runs from late September until the end of March, and a *project*, for which a dissertation is submitted by the 27th August. Successful completion of the taught component is required in order for a student to progress to the dissertation project.

All of the taught modules are of 10 credits. The foundation modules account for 50 credits and a further 30 credits are for the compulsory specialist modules appropriate to the focus of the degree. The optional modules, which account for 30 credits, are chosen from a limited range of options that enables students to substitute and add relevant specialist topics according to their preferences and their prior knowledge.

Dissertation projects are usually laboratory based, but may also involve desk or literature studies. During the dissertation project, students may be based in the university, working alongside Ph.D. students and postdoctoral research associates in established research groups, or alternatively the dissertation may entail working elsewhere, in collaboration with an industrial or academic partner. Students are encouraged to publish the results of their dissertations, and several past M.Sc. students have been successful in this respect.

(ii) Curriculum and Structure

The degree structure fits within the normal modular M.Sc. taught in the School of Biology, and the School of Agriculture, Food and Rural Development over three 'Phases' (See Figure 1), and is delivered through inter-school collaboration with other Schools, including Civil Engineering and Geosciences. The 12-month course starts in mid-September (see example diagram). The M.Sc. comprises 110 credits of taught modules and a research project (70 credits). The programme is divided into phase 1 (September – January), phase 2 (January – April) and phase 3 (May – September). The start of M.Sc. phases 1 and 2 broadly correspond to the start of undergraduate semesters 1 and 2. M.Sc. phase 2 ends in April and the M.Sc. research phase 3 starts at the beginning of the Easter term in May, extending to mid-September.

The five compulsory foundation modules (AES826, AES 827, AES 831, AES 832, AES 833) are given during phase 1 (see diagram on adjacent page). These are taught in six-week blocks and are entirely assessed through coursework. Novel Microorganisms and Natural Products (AES 825), which is a specialist compulsory module, forms a key area of the programme and is given in parallel throughout phase 1. The two remaining compulsory specialist modules (AES 824, CPE 831) are given over a shorter period in phase 2. One optional module is normally taken in phase 1, the remaining two in phase 2.

The General Paper taken in April and, particularly, the independent MSc project (70 credits) leading to a thesis allow students to apply the subject specific skills and understanding (A1-A6), the practical skills (B1-B6), the cognitive skills (C1-C6) and the key skills (D1-D8) gained during the taught components.

In phase 3, M.Sc. candidates undertake an independent project (70 credits) leading to a report that has to be submitted by the end of August. An initial project proposal is developed towards the end of phase 1 (mid-January). Although not finalised or committed, students are

encouraged to develop their proposal plans during phases 1 and 2 in view of the need to make the most of opportunities presented by independent work. However, students wishing to do projects in industrial settings may have to make their choices earlier given the competition for industrial placements.

The final oral examination for award of an M.Sc will be mid-September.

MSc PROGRAMME STRUCTURE/CALENDAR 2003/2004

SEPT	MICHAELMAS TERM	MSc PHASE 1 (16 wks)	INDUCTION WEEK				
OCT			COMPULSORY MODULE	FOUNDATION MODULE 1	FOUNDATION MODULE 2	FOUNDATION MODULE 3	MODULE OPTIONS (Normally no more than 1)
NOV				FOUNDATION MODULE 4		FOUNDATION MODULE 5	
DEC			CHRIST-MAS VAC	FINALISE ASSESSED COURSEWORK PROJECT PROPOSAL PREPARATION			
JAN	EPIPHANY TERM	MSc PHASE 2 (12 wks)	COMPULSORY MODULE	COMPULSORY MODULE	MODULE OPTION(S) (No more than 2)		
FEB			MSc EASTER VACATION (2 weeks)				
MAR	EASTER VAC	REVISION PERIOD (1 week)					
APR	EASTER TERM	MSc PHASE 3: RESEARCH PERIOD	MAIN EXAMINATION PERIOD (1 wk)				
MAY			MSc PROJECT: LITERATURE REVIEW AND PROJECT DESIGN (3 weeks)				
JUN			ENVIRONMENTAL GROUP MSc FIELD COURSE (1 week)				
JUL	SUMMER VAC	MSc PROJECT: RESEARCH PERIOD					
AUG		MSc THESIS SUBMISSION					

SEPT			POSTER PAPER PREPARATION FINAL EXAMINATION
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12 Criteria for Admission:

Entrance criteria.

A 2nd class degree from a UK University, or its overseas equivalent, is normally the minimum qualification for entry. Preferred first-degree subjects are biochemistry, biology, genetics, plant biology and zoology although it is expected that other relevant science degrees such as environmental sciences and environmental engineering will be acceptable. This should satisfy an expected demand from students from a wide variety of academic backgrounds.

Applicants for whom English is not a first language must provide evidence of a satisfactory command of English, preferably by means of a TOEFL score of 575 or greater, or by an IELTS score of 6.5 or greater.

Applicants with non-standard qualifications

Applicants who hold non-standard qualifications, and/or have relevant experience, will be considered on an individual basis.

Admissions policy

Upon receipt of a completed application form, UK-based applicants will be invited to visit the AES Department, to meet current students and to attend an informal interview. Offers of places will be made to suitably qualified candidates following the interview/visit and will be conditional upon a satisfactory reference and upon the applicant achieving a minimum of a 2nd class degree, if they do not hold such a degree at the time of the interview.

Applicants not based in the UK will not be required to attend an interview.

13 Support for Students and their Learning:

Induction

An induction period takes place at the start of MSc Phase 1. This includes

- An introduction to the modular MSc and Diploma Programme from your Degree Programme Director and meeting with other staff and students.
- An interview with your Degree Programme Advisor/Personal tutor.
- Registration in the Agricultural and Environmental Science Department with your Degree Programme Director – collect Degree Programme Handbook.
- Tour of Department and City Centre.
- Report to the Language Centre if English is not your first language.
- Report to the Registrar's and the Finance Office staff in the University Ballroom to collect Union and Library cards.

- Module selection with your Degree Programme Advisor/Personal Tutor
- Faculty introduction to services and facilities and Faculty reception.
- Tour of University field stations and/or farms.
- Preparation for the course and skills audit.
- Library skills session.
- Formal introduction to the use of computers will be provided during Induction Week and as part of the module AES826 Information Technology and Presentation Skills. Students will register for access to the computer system, and receive a personal e-mail address, at the start of the academic year, during Induction Week.

Study skills support and learning resources

- The Robinson Library houses the major book and journal collection in the University and has a large section dedicated to the biological sciences. These books are located on the fourth floor of the library and the liaison librarian is available on the fourth floor to provide help if necessary. A library card will be issued at the beginning of the academic year. The library has a wide range of library material from 'study skills', 'speed reading', through 'exams' to 'writing essays and dissertations'. These are available on a self study basis and are located on Level 2. There is a range of leaflets describing usage of the library, either as hard copy or through the Library's Web pages. In addition there are private study rooms, general work space and clusters of PCs. A series of Library and information skills workshops will be arranged for the MSc programmes during September and October and will be introduced in a special session during Induction Week (see timetable). Medical science journals are located in the Walton Library which is on the sixth floor of the Medical School in Framlington Place.
- The University Computing Service provides a large number of 'Common User' computers located in clusters in various buildings around the University. The largest of these clusters is in the Old Library User Area (OLUA) where there is also a member of computing staff available to provide help if required but there are also clusters in the Robinson Library and elsewhere on campus. Access to a machine is *via* a booking sheet located in the cluster room. For PCs, attempts are being made to standardise word processing and spreadsheet software across all Computing Service machines to Word for Windows and Excel but a range of other software is also available for use, e.g. graphics packages, reference managers with some available on the Apple-Mac system. The Computing Service provides help sheets in the use of this software and these can be obtained from the OLUA or from the Computing Service Office in the basement of Claremont Tower. Before using the machines students must register with the Computing Service at the Computing Service Office and obtain a unique identifier and password. The Faculty runs two computing facilities of workstations that are linked to the University Network. One facility, containing 82 workstations, is located in the Centre Block of the 2nd Floor of the King George VI Building and the other, containing 25 workstations, is located in Room 472 of the Ridley Building
- The Language Centre is in the Old Library and provides facilities for learning English and a wide variety of other languages. Overseas students on arrival in Newcastle will be required to take an English language test in the Centre. The results of this test will be used to assess whether further English language training is required. The Language Centre provides this training at specific times of year, however, remedial English classes can be arranged as and when required.
- Some students will already be in jobs, taking secondment to undertake the MSc/Diploma programme. For others the University provides a Careers Service which is located on the 2nd Floor of the Armstrong Building where advice on all aspects of careers is available. There is a good reference section giving detailed information about potential employers,

pamphlets to help you produce good CVs and letters of application and lists of potential vacation employment. In addition, there are a number of Careers Advisors who are available to provide advice, help and guidance throughout your time in Newcastle. Although one Careers Advisor has particular responsibility for the students in the Schools of Biology and of Agriculture, Food and Rural Development, any immediate help required can be obtained throughout the day from whichever Advisor is on Duty and if necessary an appointment can be made to have a longer interview. The sooner you start thinking about, and planning for, your future the better, especially when you are faced with applications and interviews. Full details of all services are available on the University web site. The computer-aided careers guidance system, PROSPECTS PLANNER, is available on open access at reception.

Academic and pastoral support

A system of regular fortnightly meetings with the Degree Programme Advisor provides an opportunity to discuss progress and option choices.

Special needs

The University of Newcastle upon Tyne welcomes applications from people with disabilities and makes a special effort to provide a suitable learning environment for them. It is the policy of the University that all applicants for programmes of study and research are considered on grounds of academic and individual merit separately from any other requirements. This policy is outlined to potential applicants in the University prospectuses and in the documents Newcastle University and You and Postgraduate Newcastle. All applicants with special needs should discuss their needs with the admissions tutor or the Degree Programme Advisor before applying.

14 Methods for evaluating and improving the quality and standards of teaching and learning:

Meetings with the Degree Programme Advisor

A system of regular fortnightly meetings with the Degree Programme Advisor, allows regular monitoring of comment/feedback from students. This may relate to: the course structure; individual modules; teaching techniques; administration of modules; administration of degree programmes; timetables; and efficiency of centralised facilities (such as the library or computing provision).

Student Evaluations/Questionnaires and Feedback

Students are asked to complete questionnaires relating to individual taught modules. The results of these are analysed by module leaders and the Head of Department then examines summaries. Pertinent results/comments are fed back to be addressed by the MSc/Diploma Standing Committee and/or the MSc/Diploma Joint Board of Study. Students may also be expected to complete a general evaluation questionnaire at the end of the programme. This reviews what they think of the course, what they liked and did not like, to help make improvements for the following academic year.

Reviews of Individual Modules and the MSc Programme

Both individual modules and the MSc programme are periodically reviewed in the light of the following:

- Student evaluation data
- Feedback from past graduates
- Feedback from the external examiner
- Feedback from the University Annual Monitoring Review
- Feedback from the Internal Subject review
- Feedback from independent Institutional Audit (QAA, HEFCE)
- Relevance of the programme in relation to key issues
- Relevance of programme in relation to employability of graduates

Relevance of the programme in relation to funding sources *Meetings with your Degree Programme*

Committees Responsible for Monitoring and Evaluating Quality and Standards

- Board of Examiners It is the responsibility of the Board of Examiners to assess students' progress and to recommend the successful award of degrees. There are internal and external examiners for the course.
- School Teaching and Learning Committee
- Faculty Teaching and Learning Committee
- University Teaching Committee

Staff/Student Committee

This meets once a term and provides a forum for raising any academic-related concerns. All degree programmes run by the Department are considered. It is also an opportunity for staff to consult students about course developments. Students will need to elect a representative for their degree programme, this person's task will be to consult student colleagues and then represent their views at meetings.

Board of Studies

There is a Joint Board of Studies for the MSc and Diploma degrees taught within the Department of Agricultural and Environmental Science. It oversees the academic content of the course. The Degree Programme Director chairs this Board and the membership includes those involved in the teaching. It meets approximately once a term. There is student representation on the Board.

Board of Examiners

It is the responsibility of the Joint Board of Examiners to assess students' progress and to recommend the successful award of degrees. There are internal and external examiners for the course.

Problems and Complaints

If students encounter a problem, or have any cause for complaint, they are advised to take the matter up in the first instance with the person concerned or the provider of the service. This might be a module leader or a lecturer. If it is not possible to do this they should approach the Degree Programme Advisor, who also acts as personal tutor to all students, or go direct to the Degree Programme Director.

The University has the following formal procedures to deal with specific difficulties:

- Equal Opportunities Policy
- Student Policy on Sexual and Racial Harassment
- Review Procedure for Undergraduate Examinations and Taught Postgraduate Courses
- Examination Irregularities Procedure
- University Disciplinary Procedure

These documents can be obtained from the Deputy Registrar, Registrar's Office, 6 Kensington Terrace.

Postgraduate Newcastle

This document highlights aspects of the relationship between the University and postgraduate students. In doing so it indicates the nature and level of support a student may reasonably expect to receive, identifies those services the University feels it can deliver, and sets out what the University believes it can expect of you, in the joint pursuit of high standards. The document is intended to supplement and not to replace the University's regulations or other documents specifying formal procedures or requirements that must be observed.

15 Regulation of Assessment

Progress in the taught parts of the course is assessed by continuous assessment and/or by in-course examinations held in April during MSc Phase 2. 'Foundation' modules are 100% continuously assessed during Phase 1. The Joint Board of Examiners considers progress at the end of Phase 1, after which students will be advised of their progress. The Joint Board of Examiners advises progress in most of the other taught modules after the end of Phase 2. Individual modules vary in the relative weighting of April examination and continuous assessment of course work, which may include practical classes, computer-based exercises, seminars or essays. Details are given in the module outlines. Feedback on the quality of submitted coursework will vary according to the type of assignment and is the responsibility of the individual module leaders. It may take the form of written comments or verbal feedback during seminars or tutorials. The MSc project will be assessed by examination of the final MSc project report (AES 894) at the end of the course in September. MSc candidates are normally required to attend an oral examination that covers both their course work and their project work. For further details see *Regulations for Taught Postgraduate Masters Degrees* under Faculty Regulations for Higher Degrees on the University's Web site <http://www.ncl.ac.uk/calendar/university.regs/>

Written Examinations

Candidates for both the MSc and Diploma will normally be examined by means of two hour examination papers for each of the taught modules taken. Titles of the examinations will be the same as module titles and examination numbers will be the same as module codes. In addition, each MSc programme has a special general examination paper. The MSc general paper provides an opportunity to assess interdisciplinary skills required for professional employment in the sectors targeted for each MSc programme. Specifically, this paper is designed to test (i) ability to integrate knowledge acquired from diverse components of the programme and (ii) ability to apply this knowledge in a problem-solving context. Each examination script submitted is assessed independently by one internal and one external examiner. A second internal examiner may moderate marks. The contribution of the continuous assessment marks to the overall module mark will vary according to each module (see Module Outlines). Examinations will be held in one week, after a one-week revision period. Examination Timetables will be published in March.

The pass mark for the MSc degree shall be 50 (Table 1) on all papers or their equivalent. Normally there is no opportunity to resit failed modules. In the case of failed modules, marks in the range 40-49 shall be condoned in accordance with the Faculty Regulations 6 (i), (ii) and (iii) (*see relevant section of University Calendar 2001-2002; this can be accessed on the University Website given above*). That is, the Board of Examiners may permit a candidate to qualify for the award of MSc provided that modules with a total value of no more than 40 credits have a mark between 40-49, and the average mark for all modules, including the project report, is at least 50. Candidates who fail to satisfy the Board in the written modular examinations may be awarded a Diploma in accordance with Faculty Regulations 8 (a), (b) or (c). Past examination papers, for the last two years, can be viewed on The School of Biology website: <http://www.ncl.ac.uk/biol/>

MSc Project Report Examination

Assessment is undertaken by at least two internal examiners, the principal of which is the candidate's supervisor, and the external examiner and considered by the Joint Board of Examiners meeting in September. To satisfy the examiners in the project report, candidates must normally achieve an MSc Pass mark of 55.

MSc Oral Examination

The oral examination is the final examination for the MSc degree and covers the entire course. The candidate may be questioned on any part of the course but the main purpose is for the candidate to defend his or her project and report. The Examiners will wish to raise the major questions they have identified in their examination of the project report and engage with the candidate in discussion of them. The questions may be directed, in turn, to the results and their interpretations.

Consequences of Failure of MSc Project

In accordance with Faculty Regulations, a candidate who achieves a mark of 40-49 for the assessment of the project report may, at the discretion of the examiners, be permitted to re-submit the report in a revised form for assessment. This must be by such a date as the Board of Examiners shall specify and within 12 months of the date of the original submission. Where a student fails to meet the criteria for the award of a MSc degree in sections 4-7 of the University regulations for Master of Science in the Agriculture and Biological Sciences, the student will be entitled as of right to the award of a Diploma provided that they meet the criteria specified in *Diploma Regulations in Agriculture and Biological Sciences*.

MSc with Merit

MSc degrees may be awarded with merit if, in the opinion of the Examiners, the candidate has achieved an average mark of 60-69 for both written papers and the project report.

MSc with Distinction

MSc degrees may be awarded with distinction if, in the opinion of the Examiners, the candidate has achieved excellence in all components prescribed for the award of the degree, with an average mark of ≥ 70 for both written papers and the project report.

Assessment Criteria

All postgraduate work is marked on a University scale ranging from 0-100, as explained in the Postgraduate Marking Guide (Table 1), which sets out the criteria to be used to assign marks. Most postgraduate work will be in three broad categories (Distinction, Merit and Pass) corresponding to First, Upper Second and Lower Second Class work at undergraduate level.

Assessments will be made in one of three ways, as is appropriate to the teaching technique:

- marks given to papers sat during the April examination period in Phase 2. Unless stated otherwise on the paper, each answer will be given equal weight.
- marks given to submitted work from laboratory and field classes.
- marks given to assigned work such as projects, case studies, essays or problem solving exercises.

All postgraduate work is marked on a University scale ranging from 0-100, as explained in the Postgraduate Marking Guide (Table 1), which sets out the criteria to be used to assign marks. Most postgraduate work will be in three broad categories (Distinction, Merit and Pass) corresponding to First, Upper Second and Lower Second Class work at undergraduate level.

University General Regulations state that:

‘Candidates are responsible for retaining all forms of assessed work returned to them after marking by examiners. Assessed work so retained may be recalled from candidates, if required by external examiners, or for examination review purposes, or for Quality Assessment or Audit purposes.’

Role of the External Examiner

Within the modular structure of the AES Department’s suite of taught course some modules are common to a number of taught MSc degrees. Therefore, FTC appoints external examiners to both the MSc Degree Programme and a set of modules, according to the relevant subject expertise and workload of the External Examiner. The appointment to the degree programme will be to assure the quality of the programme as well as the performance of the students on the programme. The Joint Board of Examiners undertakes the initial allocation of modules to Externals, with FTC acting as an arbiter if required.

The external examiner is a distinguished member of the scientific community whose knowledge covers the range of activities covered by the course. The external examiner is a moderator and to do this he/she:

- Sees and approves examination questions
- Sees examination scripts and comments upon standards of marking
- Sees coursework and comments upon standards of marking
- Examines projects
- Performs *viva voce* examinations of some or all students
- Attends the September meeting of the Joint Board of Examiners
- Reports to the University regarding standards and comparability of standards

Table 1. Postgraduate Marking Guide

Class	Criteria
Distinction 70-100	Outstanding work showing a thorough understanding of the subject at factual and conceptual levels, including appreciation of the evidence for various interpretations of the material and the rationale behind differing approaches. Work should show considerable evidence of reading around the subject, critical thought and analysis. Work should be free from misunderstandings and from errors both of reasoning and of factual content. Work should not include irrelevant or ambiguous material. Communication skills should be of a very high order, as evidenced by well-planned and well-presented work.
Merit 60-69	Work should show a thorough understanding of the subject as taught with evidence of reading around the subject, critical thought and analysis. Work should show the ability to think flexibly across concepts and material derived from different approaches and interpretations. Work should be generally free from misunderstandings and errors both of reasoning and factual content; irrelevant or ambiguous material should neither be so significant nor so extensive as to affect the main thrust of a piece of work. There should be a high level of competence in communication skills, producing well-planned and presented work.
Pass 50-59	Work should show a general understanding of the subject as taught, but deficiencies in both factual knowledge and conceptual grasp may be present. Work should show at least limited evidence of critical thought and analysis and/or limited evidence of additional study. Work will lack depth, including evidence of mere repetition of material from textbooks, lecture notes, etc. from memory. There are considerable amounts of irrelevant or ambiguous (though not necessarily inaccurate) material. Communication skills are satisfactory but show signs of weakness including bad planning, with some confused and poorly presented elements.

Fail 40-49	Work indicates some comprehension of basic facts and principles but incomplete understanding of the subject as taught. There is little evidence of critical thought and analysis, or of reading around the subject. Work is characterised by misunderstandings, factual errors, irrelevant and ambiguous material. Information is presented uncritically with considerable repetition of material from textbooks, lecture notes, etc. from memory (not always accurately). Communication skills reflect and compound the lack of clarity of thought and work is poorly planned.
20-39	There is no evidence of analytical capacity with little evidence of additional study. Work shows little grasp of relevant factual or conceptual aspects of the material; that reproduced from textbooks, lecture notes, etc. from memory is substantially inaccurate. Communication skills are deficient and work is badly planned and poorly presented.
0-19	Work shows no evidence of analytical capacity or additional study. Works shows little grasp of the factual aspects of the subject. Marks awarded in increments of 5 for each relevant point

16 Indicators of Quality and Standards:

Taught within a School that was part of a unit awarded a score of 22 out of a possible 24 points (equating to excellent) by the HEFCE QAA team for the quality of its undergraduate and taught postgraduate programmes.

An external research assessment exercise gave the former Department a grade 5 for the quality of its research in 1997 and 4.0 in 2001.

Apart from the usual laboratories and controlled environment facilities, it has two excellent field stations at Close House and Moorbank, access to the Faculty farms at Cockle Park and Nafferton and the world's oldest continuing grazing and hay cutting experiment at Palace Leas.

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. **It should be noted that there may be variation in the range of learning opportunities reflecting the availability of staff to teach them. While every effort will be made to ensure that the module or modules described in the programme specification are available, this cannot be guaranteed.**

The accuracy of the information contained is reviewed by the University and may be checked by the Quality Assurance Agency for Higher Education.

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

- The University Postgraduate Prospectus
- The University of Newcastle upon Tyne's Masters' Degree Programme Entrance and Progress Regulations
- The University of Newcastle upon Tyne's Regulations for Higher Degree Programmes in the Faculty of Science, Agriculture and Engineering.
- The Degree Programme Handbook
- The University's web page <http://www.ncl.ac.uk/external.phtml>
- The School of Biology web page: <http://www.ncl.ac.uk/biol/>
- The School of Agriculture and Food and Rural Development web page: <http://www.ncl.ac.uk/afrd/>
- The last Internal Annual Programme Review report

The accuracy of the information contained is reviewed by the University and may be checked by the Quality Assurance Agency for Higher Education.

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

The University Prospectus
The Departmental Prospectus
The University and Degree Programme Regulations
The Degree Programme Handbook
QAA Subject Review Report