PROGRAMME SPECIFICATION	

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University
3	**Final Award**	MSc
4	**Programme Title**	Materials Design and Engineering
5	**UCAS/Programme Code**	5135 (1-year) and 5136 (2-year)
6	**Programme Accreditation**	None
7	**QAA Subject Benchmark(s)**	Engineering
8	**FHEQ Level**	Masters
9	**Date written/revised**	March 2008

10 Programme Aims

1. To provide graduates in natural science disciplines (especially chemistry and physics), and those from chemical/process engineering backgrounds with a familiarity with new materials, coupled with a good understanding of the underpinning science to provide a springboard for promoting new engineering applications for these materials.

2. To teach design as the important linking mechanism between knowledge/ understanding of new materials and their successful introduction into engineering applications.

3. To provide UK industry with graduates equipped with science/engineering plus materials skills to fill the increasing industrial need for this combination of skills as a result of the decreasing numbers of single-subject materials graduates.

4. To provide a programme which meets the FHEQ at Masters level and which takes appropriate account of the subject benchmark statements in engineering

The programme also aims to equip students with the key/transferable skills in communication (both written and oral), the ability to employ IT and library resources, experience of working alone and meeting deadlines) and the ability to problem solve in the field of engineering materials. The standard format of the programme (5135) involves one year of full-time study; students wishing to take this programme but in some way lacking important skills may be considered for a 2-year version of the programme (5136), in which the first year acts as a preparatory year.

11 Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, and a variety of other skills and attributes in the following areas. The programme outcomes have references to the benchmark statements for engineering.

Knowledge and Understanding

On completing the programme students should have:

A1. Knowledge and understanding of the relevant mathematics and engineering science appropriate to new engineering materials.
A2. Knowledge of IT and relevant software packages applicable to materials science and especially those relevant to engineering design (including codes of practice).
A3. A good working knowledge of the properties of engineering materials.
A4. A general understanding of relevant management principles and business practices; professional and ethical responsibilities; awareness of requirements for safe usage and operation of materials.

Teaching and Learning Methods

Lectures are the main vehicle for communicating knowledge and information in all taught modules. A large fraction of the time associated with each module is devoted to private study. This includes going through lecture notes and making reference to additional material specified either directly by teaching staff or from the students' individual reading.

Assessment Strategy

Knowledge and understanding are all assessed by means of unseen written examinations. In addition, some modules include calculation sheets and assessed coursework. The written exam papers test understanding of principles and the ability to perform calculations and to understand the significance of conclusions. Some modules also involve oral presentations. Knowledge and understanding acquired during the project is assessed via the dissertation and the associated viva examination.

Intellectual Skills

On completing the programme students should be able to:

B1. Apply mathematical methods and the principles of materials science to modelling and the determination of solutions to problems in materials science.
B2. Use scientific principles to model the synthesis, processing and product development in materials, including handling unfamiliar situations and scenarios.
B3. Understand the limitations of materials, IT and modelling procedures.
B4. Generate new ideas aimed at designing new materials for new and possibly unconventional product applications.

Teaching and Learning Methods

Intellectual skills are taught via lectures. The material presented in these is supported, where relevant, by calculation sheets and computer-based learning exercises. In several modules, students learn how these principles are applied in practice, and how difficulties are overcome. In their project, students are required to use their intellectual skills to overcome specific materials problems; this particularly involves the interpretation of results obtained from analytical techniques.

Assessment Strategy

Intellectual skills are mainly assessed by unseen written examinations and in some cases assignments set throughout the year are also included. Projects provide a good test of a student's ability to develop new ideas; the viva provides the opportunity for these ideas to be demonstrated.

Practical Skills

On completing the programme students should be able to:
C1 Use mathematical and engineering science procedures as applied to materials.
C2 Use IT tools and their derivatives for materials design; be familiar with and use relevant analytical techniques.
C3 Test design ideas through laboratory work, using relevant measuring equipment and critically assessing results.
C4 Research information and evaluate and apply this to materials scenarios.
C5 Manage a project, including the monitoring and handling of a personal programme of work.

Teaching and Learning Methods

C1 is acquired via calculation sheets and also by lab work. C2 is communicated via both lectures/tutorial work combined with the project. Most aspects of C3, C4 and C5 also emerge in the execution of the individual project, where students collate/examine data relating to the behaviour of particular group(s) of materials, analytical techniques are generally involved and

these are used to test out ideas. Several modules require students to carry out personal research to find out information and apply this on materials topics (C4). The project requires careful management (C5) as regards both the use of time and developing a systematic logic for planning experimental work; p/g researchers are a valuable resource to assist student learning here.

Assessment Strategy

Calculation sheets are marked and comments returned, and the project also involves most of C1 – C5 with the final dissertation combined with the viva enabling staff to assess extremely effectively to what extent the student has acquired these skills.

Transferable/Key Skills

On completing the programme students should be able to:
D1. Use IT, display good communication and report-writing skills.
D2. Manage a project, including resource and time management.
D3. Solve problems, creatively and innovatively, handling contradictory and incomplete data.
D4. Integrate presentational techniques for maximum impact.
D5. Apply techniques for effective learning, having developed a CPD mentality.

Teaching and Learning Methods

IT skills are developed by performing written assignments and by many of the activities associated with carrying out the project. The experience of rapid information assimilation followed by an oral presentation, gives experience of the real life situation which frequently occurs in industry. Problem solving is taught in most modules. The researching of topics for both projects and oral presentations provides excellent stimuli for the development of a CPD mentality.

Assessment Strategy

D1 is assessed by selected written assignments and from oral/written presentations. The assessment of the project includes both the dissertation as well as laboratory skills and performance in a viva (D2). D3 is assessed by selected calculation sheets during the year, plus also the final written examinations, and oral presentations are assessed (D4). A measure of the success of D5 is apparent from the project viva performance.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

The 1-year version is a full-time programme of study consisting of 120 credits of taught components in Semesters 1 and 2 of the Academic Year, followed by a 60-credit project, notionally attributed to the summer period, but in practice a considerable proportion of the practical work is undertaken before the June examinations. The final dissertation is submitted by mid-August, to allow time for assessment prior to the Examination Board meetings at the end of the month. All modules are compulsory, most modules being taught at the rate of one or two lectures per week throughout the year. Students choose project topics from a list provided by the Degree Programme director at the end of the first term. It is possible for students to carry out their own project topics, provided these are approved by the Degree Programme Director. Generally, for their projects, students work alongside post-graduate and post-doctoral researchers, attending supervisory meetings with their supervisor at regular intervals. Occasionally projects involve local industry, in which case the student will visit the industrial company, and a representative of the company will attend project supervision meetings.

The 2-year version of the course consists of an introductory year of preparatory modules followed by the normal 1-year programme. In this preparatory year, there are two modules of language study plus one on Dissertation writing, all aimed at improving English language skills. The students further develop these skills in modules involving oral presentations, and also in the Library project, which involves researching a particular topic, followed by submission of a dissertation and an oral presentation. As part of the library project it is

possible for students to take 10 credits of another module by agreement with the Degree Programme Director. The remaining modules give further background in engineering, mathematics and materials; a module is also included on nanomaterials, which introduces candidates to this important topic, which is further built on in several of the materials modules the following year.

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

Most students are expected to take the 1-year format of the programme, with the 2-year modification available for those who although able to matriculate because of prior qualifications, have other limitations (especially in English language skills) which they are able to overcome by spending 2 years over the degree.

Knowledge and skills relevant to advanced materials are taught in all the materials science modules, the principles acquired being illustrated by Case Studies and extended into engineering applications in the Stress Analysis and Manufacturing Technology modules. Information acquired in lectures is reinforced by calculation and tutorial classes in which students have the opportunity to apply what they have learned in the lectures. A business strand underpins the programme, including information on environmental issues. The project. is the main vehicle for allowing students to carry out an independent programme of research into a specific area of materials activity, and this provides training in a range of useful transferable skills.

Programme regulations (link to on-line version)

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

13 Criteria for admission

Entry qualifications

Applicants require a 2nd class honours degree or better from a U.K. university, or the equivalent from an overseas institution. In exceptional cases, students with lower qualifications are considered. Students should have their first degree in an engineering or engineering-related subject, in which materials science or materials engineering has been included as a module in the first two years of the course. Candidates with first degrees in chemistry, physics or other related science subjects can also be considered in exceptional circumstances.

Admissions policy/selection tools

UK-based applicants who meet the entrance requirements outlined above are generally invited on receipt of the Application form to come up for interview – especially if they request this, or if there are other reasons why they wish to visit the school/university. Candidates supply names of referees, and at least one satisfactory reference is usually required. Under normal circumstances, suitably qualified applicants are always offered a place.

Overseas students (who from the largest number of applicants) are not invited for interview, and are offered a place if their qualifications are equivalent to those listed above for UK students, and their level of English is consistent with the University requirements for overseas students, i.e. an IELTS score of at least 6.5 or a TOEFL score of 575 or above.

Non-standard Entry Requirements

Any candidates in this category are considered on an individual basis.

Additional Requirements
None specifically.

Level of English Language capability
IELTS 6.5 or TOEFL 575 or above.

14 Support for Student Learning

Induction
During the first week of the first semester students attend an induction programme. New students will be given a general introduction to University life and the University's principle support services and general information about the School and their programme, as described in the Degree Programme Handbook. New and continuing students will be given detailed programme information and the timetable of lectures/practicals/labs/ tutorials/etc. The International Office offers an additional induction programme for overseas students.

Study skills support
Students will learn a range of Personal Transferable Skills, including Study Skills, as outlined in the Programme Specification. Some of this material, e.g. time management is covered in the appropriate Induction Programme. Students are explicitly tutored on their approach to both group and individual projects.

Numeracy support is available through Maths Aid.

Help with academic writing is available from the Writing Centre.

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 one-to-one counselling and guidance or group sessions/workshops on a range of topics, such as emotional issues eg. Stress and anxiety, student finance and budgeting, disability matters etc. There is specialist support available for students with dyslexia and mental health issues. Furthermore, the Union Society operates a Student Advice Centre, which can provide advocacy and support to students on a range of topics including housing, debt, legal issues etc.

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 questionnaires which are considered by the Board of Studies. Changes to, or the introduction of new, modules are considered at the School Teaching and Learning Committee and 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 Teaching and Learning 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. 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. Every five years degree programmes in each subject area are subject to periodic review. This involves both the detailed consideration of a range of documentation, and a two-day review visit by a review team which includes an external subject specialist in addition to University and Faculty representatives. Following the review a report is produced, which forms the basis for a decision by University Teaching and Learning Committee on whether the programmes reviewed should be re-approved for a further five year period.

Accreditation reports
Not applicable

Additional mechanisms
None

16 Regulation of assessment

Pass mark
The pass mark is 50.

Course requirements
Progression is subject to the University's Masters Degree Progress Regulations, Taught and Research and Examination Conventions for Taught Masters Degrees. Limited compensation up to 40 credits of the taught element and down to a mark of 40 is possible and there are reassessment opportunities, with certain restrictions.

Weighting of stages
For the 2-year programme, the overall mark for the first year does not contribute to the final degree awarded. However, it is essential that students obtain a pass mark (50) for the first year.

Common Marking Scheme

The University employs a common marking scheme, which is specified in the Taught Postgraduate Examination Conventions, namely:

Summary description applicable to postgraduate Masters programmes		**Summary description applicable to postgraduate Certificate and Diploma programmes**	
<50	Fail	<50	Fail
50-59	Pass	50 or above	Pass
60-69	Pass with Merit		
70 or above	Pass with Distinction		

Role of the External Examiner
An External Examiner, a distinguished member of the subject community, is appointed by Faculty Teaching and Learning 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/ or http://www.ncl.ac.uk/postgraduate/

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

The University Regulations (see http://www.ncl.ac.uk/calendar/university.regs/)

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

Development of specific Intended Learning Outcomes occurs through the following modules (all compulsory):

1-year programme

A1	Maths/Engineering Science relevant to new materials	CME8042, CME8031, CME4001, CME8032, CME8033, CME8034, CME8095, MEC4008
A2	IT/software/Design information relevant to new materials	CME8031, CME4001, CME8032, CME8095, MEC4008
A3	In-depth knowledge of properties of new materials	CME8042, CME8031, CME4001, CME8032, CME8033, CME8034, CME8095, MEC4008, CME8038
A4	Management/business/professional/ethical and health and safety procedures appropriate for new materials	BUS3010,CME8042, CME4001, CME8033, CME8012, CME8095, MEC4008, CME8038
B1	Application of maths/engineering science to new materials	CME8031, CME4001, CME8032, CME8033, CME8034, CME8095, MEC4008
B2	Modelling of synthesis/processing/product development in new materials	CME8042,CME8031, CME4001, CME8032, CME8034, CME8095
B3	Understanding the limitations of new materials	CME8042,CME8031, CME4001, CME8032, CME8033, CME8012, CME8034, CME8095, MEC4008
B4	Generating new ideas for materials design – esp. for unconventional product applications.	CME8042,CME8031, CME4001, CME8032, CME8033, CME8012, CME8034, CME8095, MEC4008, CME8038
C1	Skill/experience in the application of maths and science procedures for new materials	CME8031, CME4001,CME8032, CME8033, CME8095, MEC4008
C2	Using IT procedures for design; use of analytical techniques.	CME8031, CME4001, CME8032, CME8095, MEC4008
C3	Testing design ideas in lab work; developing a critical approach to assessment.	CME4001, CME8032, CME8012, CME8095
C4	Ability to research information in the materials context	CME8042, CME8012, CME8095, MEC4008
C5	Project management – including monitoring and managing a detailed personnel programme of work	CME8012, CME8095
D1	IT, communication and writing skills	CME8042, CME8012, CPE8095
D2	Project management – including resource/Time management	CME8012, CME8095
D3	Problem solving – development of creative + innovatory procedures for handling unsatisfactory data	CME8042, CME8031, CME8032, CME8034, CME8095, MEC4008, CME8038
D4	Integrating presentational techniques for maximum impact	CME8042, CME8095
D5	Developing techniques for effective learning including a CPD mentality	CME8042, CME8095

2-year programme

The Intended Learning Outcomes for the second year of the 2-year programme are the same as those given above for the 1-year programme. The Outcomes for the first year of the 2-year programme are as follows:

A1	Maths/Engineering Science relevant to new materials	CME8039, CME3020, CME4003, CME8096
A2	IT/software/Design information relevant to new materials	CME8039, CME3020, CME8096
A3	In-depth knowledge of properties of new materials	MMM8039, CME4003, CME8096
A4	Management/business/professional/ethical and health and safety procedures appropriate for new materials	CME4003, CME8096
B1	Application of maths/engineering science to new materials	CME8039, CME3020, CME8096
B2	Modelling of synthesis/processing/product development in new materials	CME8039, CME3020, CME8096, CME4003
B3	Understanding the limitations of new materials	CME8039, CME3020, CME4003, CME8096
B4	Generating new ideas for designing new materials, including unconventional product applications.	CME8039, CME3020, CME4003, CME8096
C1	Skill/experience in the application of maths and science procedures for new materials	CME3020, CME8096
C2	Using IT procedures for design; use of analytical techniques.	CME8039, CME8096
C3	Testing design ideas in lab work; developing a critical approach to assessment.	CME3020, CME8096
C4	Ability to research information in the materials context	CME8039, CME3020, CME4003, CME8096
C5	Project management – including monitoring and managing a detailed personnel programme of work	CME8096
D1	IT, communication and writing skills	LCEXXXX, LCE8014, CME4003, CME8096
D2	Project management – including resource/Time management	LCE8014, CME8096
D3	Problem solving – development of creative + innov-atory procedures for handling unsatisfactory data	CME8039, CME3020, CME4003, CME8096
D4	Integrating presentational techniques for maximum impact	LCEXXXX, LCE8014, CME4003, CME8096
D5	Developing techniques for effective learning including a CPD mentality	LCEXXXX, LCE8014, CME4003, CME8096