PROGRAMME SPECIFICATION	

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University Singapore Institute of Technology
3	**Final Award**	BEng Hons
4	**Programme Title**	Chemical Engineering
5	**UCAS/Programme Code**	1209
6	**Programme Accreditation**	IChemE, Energy Institute
7	**QAA Subject Benchmark(s)**	Engineering
8	**FHEQ Level**	Level 6
9	**Date written/revised**	May 2012

10 Programme Aims

The aim of the Degree programme is to produce graduates who have a coherent understanding of chemical engineering, combining a sound theoretical grasp of the subject with practical experience and an awareness of their responsibilities to society and the environment. Graduates should be capable of becoming professional chemical and process engineers in industry or of following a postgraduate route into a research, industrial or academic career. In order to meet this aim, the Degree programme has the following objectives:-

1) To produce graduates who have vision and the ability to address the challenges posed by society through the deployment of the skills and knowledge gained during their Degree course.
2) To equip students with a knowledge and understanding of the subject, including the core material specified by the accrediting professional institutions (The Institution of Chemical Engineers and the Energy Institute).
3) To provide opportunities for students to acquire further knowledge, both in breadth and depth, and to specialise according to their own interests as they develop over the duration of the programme.
4) To enable students to eventually meet the requirements of the accrediting Institutions for Chartered Membership or Professional Engineer status.
5) To equip students with appropriate practical skills in information processing, data analysis, problem solving, teamwork, and communication skills.
6) To encourage students to develop responsible attitudes towards the needs of society and the environment in the application of their engineering and economic knowledge and to ensure that they have particular regard for the importance of safety in their industrial life.
7) To encourage students to develop appropriate attitudes towards their own future professional development.
8) To provide a programme of study which meets the FHEQ Honours level and which also takes account of the subject benchmarks in QAA Engineering and UK-Spec professional standards.

11 Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other 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 appropriate knowledge and understanding of:

A1 Background Mathematics, Statistics and Chemistry that are relevant to Chemical and Process (C&P) Engineering.

A2 The fundamental concepts, principles and theories of C&P Engineering.

A3 Business and management techniques relevant to C&P Engineering and Chemical Engineers.

A4 The role of Chemical Engineers in society and the constraints within which their engineering judgement will be exercised, including the professional and ethical responsibilities of Chemical Engineers.

A5 The environmental and safety issues that affect C&P Engineering and the issues associated with sustainable engineering solutions.

A6 Conceptual, elemental and detailed design of processes and process plant.

A7 Safe operation of processes and plant, including the use of IT for design, control and management.

A8 Codes of practice, design, the assessment of safety and environmental risks, and the legislative framework for safety.

Learning and Teaching Methods

Knowledge and understanding is primarily imparted through a combination of lectures, tutorials, example classes, case studies, laboratory experiments, coursework and projects in all Years. In some cases, the formal lectures are supplemented by computer assisted learning (CAL). A number of visiting lecturers and professors contribute to A5, A6, A7 and A8.

Throughout the course, learners are encouraged to undertake independent reading to deepen, supplement and consolidate learning and teaching and to broaden their individual knowledge and understanding of the subject. In the final year students are given guidance and are directed to engineering literature related to their design projects. Feedback on essays, laboratory and project reports allows students to refine their presentation techniques in these areas, and to assess the level of their knowledge and understanding.

Assessment Strategy

Testing the knowledge base is through a combination of unseen written examinations and assessed coursework in the form of laboratory experiment write-ups, coursework reports, project reports and presentations. The proportion of in-course and written examination towards the final module assessment is usually 25/75 although this can vary as appropriate for the module and level of study.

Intellectual Skills

On completing the programme students should be able to:

B1 Select and apply appropriate scientific principles, mathematical methods and computer based methods for modelling and analysing engineering problems.

B2 Analyse experimental or computational results and determine their strength and validity.

B3 Analyse systems, processes and components requiring engineering solutions and to produce a conceptual or elemental design to a specification.

B4 Use the scientific literature effectively and to search for information to develop concepts.

B5 Produce a full design specification for a process or process plant.

B6 Identify the required cost, quality, safety, reliability, appearance, fitness for purpose and environmental impact of the application of the design and assess commercial risk.

B7 Project manage a task.

B8 Determine the criteria for evaluating a design solution and evaluate an outcome of the design against the original specification.

Learning and Teaching Methods

Subject-specific/professional skills are developed through laboratory experiments and project work (B1-B4), design exercises throughout years 1 and 2 (B5-B8). Lectures, tutorials, case studies and seminars of specific modules develop skills B1, B3, B5 (Process Design; Computing and Simulation; Process Modelling, Dynamics and Control), B5-B6 and B8 (Plant Design) and B7 (Process Design, Economics and Project Management). From the first year, students are required, after appropriate guidance, to search the literature for information and submit all written work in an appropriate scientific and engineering format so that B1-B4 are thoroughly integrated into all submitted work by the final year. Students are encouraged to develop appropriate professional and practical skills (B1-B4) by monitored attendance at laboratory sessions during all years of their studies. Feedback on all submitted work enhances learning of the skills B5-B8 culminating in the year 2 Design Project. Some projects are carried out in small groups and some individually. All are monitored by an academic supervisor and in some cases, industrial supervisors may provide additional support.

Assessment Strategy

Practical skills are assessed through laboratory experiment write-ups, coursework and project reports, presentations, group oral discussions, and unseen written examinations. Skills B5-B8 form a major part of the assessment of the year 3 design project.

Practical Skills

On completing the programme students should be able to:

C1 Plan, conduct and report a programme of investigative work.
C2 Analyse and solve engineering problems.
C3 Design a process or process plant to meet a need.
C4 Be creative in the solution of problems and in the development of designs.
C5 Evaluate designs and make improvements.
C6 Integrate and evaluate information and data from a variety of sources.
C7 Take a holistic approach to solving problems and designing systems, applying professional judgements to balance risks, costs, benefits, safety, sustainability, reliability, aesthetics and environmental impact.

Learning and Teaching Methods

Analysis and problem solving skills are developed through example classes, tutorials, coursework and project work. Experimental, research and design skills are developed through coursework activities, laboratory experiments, and design projects. Individual feedback is given to students on all work produced. Students in all years are encouraged, following appropriate guidance, to plan and carry out their investigative work and analyse the experimental data in critical manner. Feedback provided on all submitted work provides opportunities for students to improve their skills. In particular, project work provides the opportunity to develop skills C1-C7.

Assessment Strategy

Analysis and problem solving skills are assessed through unseen written examinations and coursework. Experimental, research and design skills are assessed through laboratory experiment write-ups, coursework reports and project reports, presentations and unseen written examinations. Creative and design skills are assessed through design project reports and design presentations.

Transferable/Key Skills

On completing the programme students should be able to:
D1 Communicate effectively (orally and in writing).
D2 Apply mathematical skills through modelling and analysis.
D3 Work as a member of a team (an interdisciplinary team where appropriate).
D4 Develop ideas and solutions to engineering problems.
D5 Use information and communications technology.
D6 Manage resources and time, plan, organise and prioritise work effectively to meet deadlines.
D7 Learn independently in familiar and unfamiliar situations with open-mindedness and in the spirit of critical enquiry.
D8 Learn effectively for the purpose of continuing professional development and in a wider context throughout their career.

Learning and Teaching Methods

Transferable skills are developed through the learning and teaching programme outlined above (and in section 11). Basic communication skills D1 are introduced during the Induction period and developed further via individual and team projects throughout other modules (e.g. CME2116 and CME2121) and design related projects in each year. These are then enhanced through feedback on written reports and oral presentations made as part of coursework assignments. Additionally, transferable skills are also applied in many subject-specific modules with students required to find information and give oral and/or written presentations throughout all years of study. Deadlines for submission of coursework are enforced, encouraging students to develop D6 and this is supported by guidance provided during Induction week at each year of the programme. Design problems at each year provide an opportunity to develop skills D3-D8.

Assessment Strategy

Transferable and communication skills are assessed through coursework reports, presentations and oral examinations. The assessment of the year 2 Design Project includes an assessment of key skills.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

Year 1 reinforces the fundamentals of Chemical Engineering that would have been gained during Diploma courses as well as developing deeper knowledge in Chemistry, Thermodynamics and Mathematics for higher level study. Fundamental Chemical Engineering topics such as Process Safety, Transfer Processes, Reactor Engineering, Process Dynamics, Process Control are introduced.

Year 2 contains a major group process plant design project that requires candidates to apply their Chemical Engineering knowledge in a holistic and integrated manner. This project addresses many learning outcomes including acquisition of new knowledge, intellectual abilities, practical skills and transferable skills. Supporting this will be modules that cover more advanced Chemical Engineering subjects including one on Process Design, Economics and Project Management. A major focus in year 2 is Sustainability, with 35 credits of subject material.

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

This is a 2 year degree programme which is specifically designed for those candidates who have successfully completed a Diploma in Chemical Engineering or relevant subject to an appropriate level, at any polytechnic in Singapore.

This programme is delivered by Newcastle University in collaboration with the Singapore Institute of Technology, at the Ngee Ann Polytechnic campus in Singapore.

The quality and standards of delivery in Singapore will be the same as the delivery of similar programmes in the School of Chemical Engineering and Advanced Materials at Newcastle University. Successful candidates will be awarded a BEng (Hons) degree from Newcastle University.

Progression from Year 1 to Year 2 and the award of the final degree are subject to the regulations and guidelines contained in the University's Undergraduate Progress Regulations and Undergraduate Examination Conventions.

After completion of Year 1 in Singapore, students should attend an immersion programme delivered at Newcastle University campus during the UK summer vacation over a short period of 3 to 5 weeks. The Newcastle campus summer immersion programme will be an in-depth induction to the academic skills and "mindset" demanded for high-level performance at Honours degree level (and in particular the year 2 major plant design project) focussed around the Newcastle University Graduate Skills Framework. It will include both individual and team activities and various forms of written and oral presentations.

Programme regulations (link to on-line version)

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

13 Criteria for admission

Entry qualifications

The degree programme is designed for students who hold a Diploma in Chemical Engineering or equivalent qualification from any of the polytechnics in Singapore.

All applicants are considered individually on the basis of past academic performance and, in particular, predicted achievement. The normal offer is a minimum CGPA of 3, which is equivalent to the entry requirement for direct entry into Stage 2 of Chemical Engineering degree programmes delivered in Newcastle. Relevant working experience will also be taken into consideration.

Admissions policy/selection tools

All applicants will be interviewed by representatives of Singapore Institute of Technology and Newcastle University while final selection is made by the School of Chemical Engineering and Advanced Materials.

14 Support for Student Learning

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

Induction

There are 2 induction programmes, one by SIT in August and one in the first week of the first semester conducted by Newcastle University New students will be given a general introduction to life as a Newcastle University student in Singapore, to the principal support services that will be available to students and to general information about 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.

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.

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 Director of Operations in Singapore, Degree Programme Director or Head of School may be consulted. Issues relating to the programme may be raised at the Staff-Student Committee in Singapore, 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. Details of the personal tutor system can be found at: http://www.ncl.ac.uk/undergraduate/life/support/

In addition Newcastle University and Ngee Ann Polytechnic offer a range of support services, details of which are available on the following websites:
For Newcastle University:
http://www.ncl.ac.uk/undergraduate/support/
For Ngee Ann Polytechnic:
http://www.np.edu.sg/ss/

Support for students with disabilities
The Ngee Ann Disability Support Service provides help and advice for disabled students. It provides individuals with: advice about 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. During their immersion in Newcastle, help and advice for students with disability will be provided by the University's Disability Support Service.

Learning resources
Newcastle University's main learning resources are provided by the Robinson Library (for books, journals, online resources), and by Information Systems and Services, which supports campus-wide computing facilities, including BlackBoard. Ngee Ann Polytechnic's library also holds a collection of texts specified by Newcastle University to support the Chemical Engineering degree programme.

Students on this programme will be able to have access to a wide range of computing facilities through Newcastle University's "Remote Access System" or ras.ncl.ac.uk. Increasingly, library material is available electronically via remote access so Newcastle University's library holdings will be available to students in Singapore.

The Singapore Institute of Technology, through facilities available at Ngee Ann Polytechnic, provides an extensive and advanced library facility with access to media, e-books, databases, e-journals and many other information resources such as OPAC on their library catalogues.

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

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 Learning and Teaching Committee and at the Board of Studies. Student opinion is sought at the Staff-Student Committee in Singapore, which reports back to Board of Studies, and/or by comments from students' representatives directly sent to the Board of Studies at Newcastle University. New modules and major changes to existing modules are subject to approval by the Faculty Learning, Teaching and Student Experience Committee at Newcastle University.

Programme reviews
The Board of Studies conducts an Annual Monitoring and Review of the degree programme and reports to Faculty Learning, Teaching and Student Experience 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 in Singapore (see above).

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

Faculty and University Review Mechanisms
The programme is subject to the University's Internal Subject Review process, see http://www.ncl.ac.uk/quilt/atoz/policies.htm

Accreditation reports
Accreditation will be sought from the IChemE

Additional mechanisms
All staff are subject to periodic peer observation of their teaching. Any issues arising are dealt with by the School Learning and Teaching Committee.

16 Regulation of assessment

Pass mark
The pass mark is 40 (Undergraduate programmes)

Course requirements
Progression is subject to the University's Undergraduate Progress Regulations and Undergraduate Examination Conventions. In summary, students must pass, or be deemed to have passed, 120 credits at each year. Limited compensation in up to 40 credits and down to a mark of 35 is possible at year 2 and there are resit opportunities, with certain restrictions.

Weighting of stages
The marks from years 1 and 2 will contribute to the final classification of the degree
The weighting of marks contributing to the degree for years 1:2 is 1:2

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

	Modules used for degree classification (DC)
<40	Fail
40-49	Third Class
50-59	Second Class, Second Division
60-69	Second Class, First Division
70+	First Class

Role of the External Examiner
An External Examiner, a distinguished member of the subject community, is appointed by FLTSEC, 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

Ngee Ann Polytechnic's general information (see http://www.np.edu.sg)

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

Intended Learning Outcome	Module codes (Compulsory in Bold)
A1	**CME2126, CME2117, CME2125, CME2116, CME3107**
A2	**CME2116, CME2120, CME2121, CME2122, CEM2123, CME2124, CME2125, CME3103, CME3104, CME3105, CME3106, CME3108, CME3122, CME3110. CME3112, CME3113**
A3	**CME3103, CME3109**
A4	**CME2120, CME2121, CME3103, CEM3109, CME3122, CEM3110, CEM3112, CEM3113**
A5	**CME2120, CME2121, CME3103, CME3109, CME3106, CME3122, CME3110, CEM3112, CEM3113**
A6	**CME2117, CME2121, CEM2122, CME2123, CME2124, CME3103, CME3104, CME3105, CME3108, CME3109, CEM3112, CEM3113**
A7	**CME2116, CME2117, CEM2120, CEM2121, CEM3103, CME3106, CME3108, CME3109**
A8	**CME2120, CME2121, CME3106, CME3109, CEM3122, CME3112, CEM3113**
B1	**CME2116, CME2117, CME2121, CME3103, CME3108, CME3109**
B2	**CME2116, CME2117, CME2121, CME2126, CME3103, CME3106, CME3109**
B3	**CME2116, CME2117, CME2121, CME2122, CME2123, CME2124, CME3103, CME3104, CME3105, CME3108, CME3109, CME3112**
B4	**CME2116, CME2121, CME3109, CME3122, CME3110, CME3112, CME3113**
B5	**CME2121, CME2123, CME3109**
B6	**CME2120, CME2121, CME3103, CME3106, CEM3109, CEM3112**
B7	**CME2121, CME3103, CME3109**
B8	**CME3109, CME2121**
C1	**CME2116, CME2117, CME2121, CEM3109**
C2	**CME2116, CME2117, CME2120, CME2121, CME2122, CME2123, CME2124, CME2125, CME2126, CME3103, CME3104, CME3105, CME3106, CME3107, CME3108, CME3109, CME3122, CME3110, CME3112, CME3113**
C3	**CME2121, CME2122, CME2123, CME2124, CME3103, CME3104, CME3105, CME3109, CME3122,**
C4	**CME2116, CME2177, CME2121, CME3109**
C5	**CME3108, CME3109, CME3110, CME3112**
C6	**CME2116, CME2117, CME2120, CME2121, CME2122, CME2123, CME2124, CME2125, CME2126, CME3103, CME3104, CME3105, CME3106, CME3107, CME3108, CME3109, CME3122, CME3110, CME3112, CME3113**
C6	**CME3109, CME3106, CME3112, CEM3110**
D1	**CME2116, CME2121, CEM2123, CME3107, CME3109, CME3110**
D2	**CME2116, CME2117, CME2121, CEM2122, CEM2123, CEM2124, CEM3104, CEM3105, CEM3107, CEM3108, CEM3109, CME3112**
D3	**CME2121, CME3109**
D4	**CME2120, CME2121, CME3103, CEM3109, CME3122, CEM3110, CEM3112, CEM3113**
D5	**CME2116, CME2117, CME2120, CME2121, CME2122,**

	CME2123, CME2124, CME2125, CME2126, CME3103, CME3104, CME3105, CME3106, CME3107, CME3108, CME3109, CME3122, CME3110, CME3112, CME3113
D6	**CME2116, CME2117, CME2120, CME2121, CME2122, CME2123, CME2124, CME2125, CME2126, CME3103, CME3104, CME3105, CME3106, CME3107, CME3108, CME3109, CME3122, CME3110, CME3112, CME3113**
D7	**CME2116, CME2117, CME2120, CME2121, CME2122, CME2123, CME2124, CME2125, CME2126, CME3103, CME3104, CME3105, CME3106, CME3107, CME3108, CME3109, CME3122, CME3110, CME3112, CME3113**
D8	**CME2116, CME2117, CME2120, CME2121, CME2122, CME2123, CME2124, CME2125, CME2126, CME3103, CME3104, CME3105, CME3106, CME3107, CME3108, CME3109, CME3122, CME3110, CME3112, CME3113**