PROGRAMME SPECIFICATION	

1	**Awarding Institution**	Newcastle University, Université de Nice – Sophia Antipolis, Brandenburg Technische Universitat Cottbus, Budapesti Mûszaki Es Gazdasagtudomanyi Egyetem, Universitat Politecnica de Cataluna
2	**Teaching Institution**	Newcastle University, Université de Nice – Sophia Antipolis, Brandenburg Technische Universitat Cottbus, Budapesti Mûszaki Es Gazdasagtudomanyi Egyetem, Universitat Politecnica de Cataluna
3	**Final Award**	MSc
4	**Programme Title**	MSc in Hydroinformatics and Water Management (Euro Aquae)
5	**Programme Code**	5140
6	**Programme Accreditation**	
7	**QAA Subject Benchmark(s)**	Engineering
8	**FHEQ Level**	7
9	**Last updated**	April 2011

10 Programme Aims

1 to provide opportunities for candidates with first degrees in a range of scientific and engineering disciplines to enhance their knowledge of the water environment through a programme involving theoretical, practical and computational (informatics) components;

2 to prepare and train future scientists and executive engineers in charge of modelling and managing projects in hydro-technologies and environment. These professionals have a vocation to assist local, regional, national and international collectives, public services and to be involved in private companies

3 to offer experience in the planning and execution of an extended research project;

4 to provide experience of dissertation writing and other presentational skills;

5 to be part of the Erasmus Mundus programme, the European Union co-operation and

mobility programme in the field of higher education;

6 To provide a programme which meets the Frameworks for Higher Education Qualifications (FHEQ) in UK, the French Ministry of Education standards and accreditation procedures (Ministry expertise every 4 years and Conseil National d'Evaluation CNE for the whole institution) in France, the Quality agencies of Spain, (any other regulation in the participating countries) at Masters level.

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 (E).

Knowledge and Understanding

On completing the programme students should:

A1 A sound scientific understanding of key basic subject areas of mathematics, physics, hydrology, hydraulics, Information and Communication Technologies (ICT), and geographic information systems (GIS).

A2 An advanced knowledge and understanding and critical awareness of specialisations at the forefront of discipline in water management, software engineering and modelling, decision support systems, water and society.

A3 Quantitative training in mathematical methods, computational modelling and hydroinformatic techniques.

A4 Knowledge of specific examples of schemes for groundwater, urban and rural water management.

A5 Understanding of Web-based collaboration "any place – any time" potential in professional environment

Teaching and Learning Methods

Outcomes are reached through a series of 4 stages (semesters), carried out at different institutions. A.1 is addressed primarily during the "Basic acquisitions" phase in Semester 1. A2 and A3 are achieved during the Hydroinformatics phase of Semester 2. A.4 and A.5 are achieved in Semester 3 (Thematic specialism phase). All (A.1 to A.4) are reinforced and practiced during Semester 4 in "Professional practice and Research". Teaching is by a mixture of intensive one-week residential courses and conventional taught modules, both of these comprising lectures and tutorials. Acquisition of A.2 and A.4 is partly by the above techniques and partly by field visits, applied research projects carried out in universities and with industrial partners, and project work in professional practice.

Assessment Strategy

Assessment occurs through tutorial examples and coursework. The primary means of assessing factual knowledge is the closed book examination. This is supported by assessed written coursework.

In-depth individual learning is essential for the completion of the dissertation.

Intellectual Skills

On completing the programme students should be able to:

B1 Ability to select and apply appropriate mathematical methods for modelling and analysing relevant problems;

B2 Use of scientific principles in the development of engineering and environmental solutions to practical problems in the water environment and water infrastructure operation;

B3 Use of scientific principles in the modelling and analysis of the water environment and of water infrastructure operation;

B4 Decision making in complex and unpredictable situations, leading to the ability to select and apply appropriate computer-based methods for modelling and analyzing problems in the water environment and in water infrastructure operation;

B5 Originality in the creation of new products or methodologies or research outputs through synthesis of ideas from a wide range of sources;

B6 Ability to produce solutions to problems through the application of engineering and water environment knowledge and understanding.

B7 Ability to build and manage team work in virtual environment

Teaching and Learning Methods

Fundamental aspects of B1 and B7 are developed in Semester 1 (Basic courses in maths/physics/hydraulics etc and Collaborative Engineering.) Subsequently, B1– B6 are primarily acquired in Semesters 2 and 3 during the intensive modules addressing specialist themes and

hydroinformatic methods. : these include hands-on computer laboratories and design-based activities. B5 and B7 are further developed in design-based and problem-solving assignments in Semesters 2 and 3, and are also reinforced and practiced in Semester 4 during either a research project or professional practice.

Assessment Strategy

Closed-book examinations are used to assess intellectual abilities while assessed coursework provides further opportunities to demonstrate intellect and ability. The dissertation provides final evidence of the levels attained.

Practical Skills

On completing the programme students should be able to:

C1 The ability to use ICT tools and hydroinformatics technologies;

C2 Ability to design components of the water infrastructure and schemes for management of the water environment;

C3 Practical testing of design ideas through computer simulation with technical analysis and critical evaluation of results;

C4 Ability to evaluate critically the application of engineering and environmental techniques dealing with complex issues such as industrial, legislative and commercial constraints;

C5 Planning, execution and reporting of a research project;

C6 Ability to search for information and develop ideas further.

C7 Ability to manage project work in teams in decentralized environment using ICT

Teaching and Learning Methods

C1 is taught principally through lectures and tutorials in Semester 1 and 2. C2-C4 are taught in Semesters 2 and 3 during more intensive modules addressing specialist themes and hydroinformatic methods: these include hands-on computer laboratories and design-based activities. C7 is covered in one module in semester1 and another in semester 3. C5 and C6 are primarily developed and practiced in Semester 4 during the research project or projects in professional practice.

Assessment Strategy

C1 and C2 are explicitly assessed in Semester1, 2 and 3 modules. Other outcomes C3-C7 are assessed through coursework and project requirements.

Transferable/Key Skills

On completing the programme students should be able to:

D1 Manipulation and presentation of data in a variety of ways;

D2 Use of methods based on scientific evidence in the solution of problems;

D3 Use of initiative, creativity and innovation in problem solving;

D4 Effective communication in English (including written, oral and poster media);

D5 Use of generic ICT, GIS and programming skills;

D6 Independent learning and wider time and resource management;

D7 Collaborative approach to team working and project management in interdisciplinary and multicultural environment.

Teaching and Learning Methods

Outcomes D1, D2 and D5 are developed and practiced in the first semester modules addressing basic essential subjects. D.4 (communication in English) is specifically addressed with a module in Semester 2, and then built upon in subsequent modules, particularly the project or professional

practice in semester 4. D.7 is a specialist skill in high demand in the engineering profession, and is addressed specifically by an innovative international web-based collaborative study in Semester 1. All outcomes D.1 – D.7 are developed further and practiced in coursework assignments in Semesters 2 and 3. Subsequently, the principal development of transferable skills (and D.4 and D.6 in particular) occurs through involvement in the research project or professional practice.

Assessment Strategy

Skills D1–D3 are essential to complete examinations and assignments to a satisfactory standard. Acquisition of D4 is demonstrated during assessment of coursework and of the project. D5 is explicitly assessed in GIS and ICT modules in Semester 1.

Outcomes D5 and D6 are essential for satisfactory completion of the courseworksand the final project so they are indirectly assessed through coursework and project assessment. Completion of the project also requires command of outcomes D1–D4. D7 is trained in project work during Semester 3 but it is not explicitly assessed.

The above Learning Outcomes have been compared with the QAA Frameworks for Higher Education Qualifications Descriptor for a qualification at Masters (7) level. They are believed to meet or exceed the requirements of that Descriptor.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

Euro-Aquae is a modular degree designed for flexible delivery at a number of institutions, allowing and encouraging mobility of students. It is part of the Erasmus Mundus programme, a co-operation and mobility programme in the field of higher education which promotes the European Union as a centre of excellence in learning around the world.

Erasmus Mundus supports European top-quality Masters Courses and enhances the visibility and attractiveness of European higher education in third countries. It also provides EU-funded scholarships for third country nationals participating in these Masters Courses.

The masters programme spans 4 semesters, or 2 years, and has the following partners:

- University of Nice-Sophia Antipolis (UNSA, France)
- Brandenburg University of Technology Cottbus (BTUC, Germany)
- Budapest University of Technology and Economics (BUTE, Hungary)
- Technical University of Catalonia (UPC, Spain)
- University of Newcastle upon Tyne (UNUT, UK)

The programme is organized in a pedagogic continuum to provide introduction and common knowledge/soft skills (sem. 1 all locations), acquisition and the use of hydroinformatics concepts, methods and tools (sem. 2 UNUT), a thematic specialisation: hydroinformatics systems, urban waters management, inland management, decision support systems (sem. 3 all locations except UNUT) and for semester 4 (all locations), a research project or professional practice. The consortium issues a joint degree (MSc.) defined as Master of Sciences in Hydro-Informatics & Water Management recognized by all the participating countries.

Every MSc student takes modules to a total value of 120 ECTS credits over four semesters (two years).

Mobility is a fundamental concept of the programme which is used to develop and promote a common vision and professional capacity through a variety of specializations. The students must follow at least 30% (36 ECTS) of the curricula in a different institution from their “European home institution”. The mobility is applied in semesters 2, 3 and 4.

All students are appointed an academic supervisor and an industrial supervisor to advise on the work-based dissertation and any issues that may arise during the programme. All students are required to discuss their pattern of study with their academic tutor to ensure that they are following an appropriate programme.

The programme of study is as defined below:

In semester 1 of year 1, candidates take a total of 30 ECTS credits consisting of the following compulsory modules to value 2 ECTS credits,

Code	*ECTS Credits*	*Sem*	*Comp /Opt*	*Institution*	*Descriptive title*
EU-AQ-1.5-C	2	1	C	Any	Web-based collaborative engineering

and compulsory modules to the value of 28 ECTS (30 ECTS in NU) credits at any one selected institution as follows;

Code	*ECTS Credits*	*Sem*	*Comp /Opt*	*Institution*	*Descriptive title*
UNSA -1.1	6	1	C	UNSA	Mathematics and Physics
UNSA-1.2	6	1	C	UNSA	Hydrology and Hydraulics
UNSA-1.3	6	1	C	UNSA	Intro to Water and aquatic environment management
UNSA 1.4	6	1	C	UNSA	Computer skills, databases & GIS-ICT
EU-AQ-1.1-C	6	1	C	BTUC	Mathematics and Physics
EU-AQ-1.2-C	6	1	C	BTUC	Hydrology and Hydraulics
EU-AQ-1.3-C	6	1	C	BTUC	Intro to Water and aquatic environment management
EU-AQ-1.4-C	6	1	C	BTUC	Computer skills, databases & GIS-ICT
CEG8501	5	1	C	NU	Quantitative Methods for Engineering
CEG8503	10	1	C	NU	Hydrosystems : Processes and Management
CEG8506	5	1	C	NU	Hydrosystems modelling
CEG8505	5	1	C	NU	Climate Change: Earth System, Future Scenarios and Threats
BUTE-1.1	6	1	C	BUTE	Mathematics and Physics
BUTE-1.2	6	1	C	BUTE	Hydrology and Hydraulics
BUTE-1.3	6	1	C	BUTE	Intro to Water and aquatic environment management
BUTE 1.4	6	1	C	BUTE	Computer skills, databases &GIS-ICT
UPC 101	6	1	C	UPC	Applied Differential Equations
UPC 102	6	1	C	UPC	Hydrology
UPC 103	6	1	C	UPC	Hydraulics
UPC 104	6	1	C	UPC	Environmental Engineering
UPC 105	6	1	C	UPC	Computer skills, databases &GIS-ICT

In semester 2 of year 1, candidates should take 30 ECTS credits at UNUT:

Code	*ECTS Credits*	*Sem*	*Comp /Opt*	*Institution*	*Descriptive title*
CEG8512	5	2	C	NU	Integrated River Basin Management
CEG8513	5	2	C	NU	Hydroinformatic Systems Development
CEG8516	5	2	O	NU	Groundwater Modelling
CEG8517	5	2	C	NU	Computational Hydraulics
CEG8515	5	2	C	NU	Modelling of Floods
CEG 8514	5	2	C	NU	Climate Change: Vulnerability, Impacts and Adaptation
*INU8001**	5	2	C	NU	*Writing Dissertations in Science and Engineering*

* Candidates who are native English speakers or who achieve entrance level 3 exam in all categories may choose from the following alternatives (at the discretion of the DPD):

Code	*ECTS Credits*	*Sem*	*Comp /Opt*	*Institution*	*Descriptive title*
SPG8009	5	2	O	NU	Renewable Energy: Policy, Politics and Ethics
CEG8502	5	1	O	NU	Quantitative Methods for Engineering (flexible)

In semester 1 of year 2, candidates take 30 ECTS consisting of 1 compulsory module (6 ECTS), one of two optional modules (6 ECTS) and 18 ECTS at any 1 institution:

Code	*ECTS Credits*	*Sem*	*Comp /Opt*	*Institution*	*Descriptive title*
EU-AQ-3.X_E	6	1	C	Any	Hydro-Europe Working as virtual company/institute
EU-AQ-3.Y_E	6	1	O	Any	Research Introduction
EU-AQ-3.Y_C	6	1	O	Any	Pre-professional training
UNSA 3.1	5	1	C	UNSA	Modelling methods for urban waters
UNSA 3.2	3	1	C	UNSA	Methods for water supply and waste water treatment
UNSA 3.3	5	1	C	UNSA	Economical and legal environments
UNSA 3.4	5	1	C	UNSA	Project Management and communication
EU-AQ-3.1-C	6	1	C	BTUC	Coupling free-surface and groundwater modelling
EU-AQ-3.2-C	4	1	C	BTUC	Modelling business processes, workflow and information management
EU-AQ-3.3-C	4	1	C	BTUC	Geometric modelling and presentation methods
EU-AQ-3.4-C	4	1	C	BTUC	Monitoring, data acquisition and documentation
BUTE 3.1	6	1	C	BUTE	Modelling methods for inland surface waters
BUTE 3.2	4	1	C	BUTE	Hydrological modelling and forecasting
BUTE 3.3	4	1	C	BUTE	River basin management and planning
BUTE 3.4	4	1	C	BUTE	Advanced hydrometry and data analysis
UPC 301	3	1	C	UPC	Artificial neural network in decision support systems
UPC 302	5	1	C	UPC	Flood risk concepts and application in river basin management
UPC 303	5	1	C	UPC	Floods and urban drainage
UPC 304	5	1	C	UPC	Real time control of hdraulic systems

In semester 2 of year 2, candidates should take one of the following modules worth 30 ECTS credits:

Code	*ECTS Credits*	*Sem*	*Comp /Opt*	*Institution*	*Descriptive title*
EU-AQ-4.1_C	30	2	O	Any	Research and development project
EU-AQ-4.1_E	30	2	O	Any	Professional practice

Students can, in the summer between Year 1 and Year 2, take part in a summer school at one of the Action III fully integrated partner institutions where they can take one or more of the additional modules from the bellow list. These modules can be accredited as prior learning towards modules of semester3 in agreement with the semester 3 host institution.

Code	*ECTS Credits*	*Comp /Opt*	*Institution*	*Descriptive title*
Module 7.1	5 ECTS	O	EPFL/ETHZ	Hydrologic forecasting and risk
Module 7.2	5 ECTS	O	EPFL/ETHZ	Dams and hydraulic engineering works -

				specialisation module
Module 7.3	5 ECTS	O	EPFL/ETHZ	Snow and glacier hydrology - specialisation module
Module 7.4	5 ECTS	O	EPFL/ETHZ	Hydroelectric power schemes - specialisation module
Module 7.5	5 ECTS	O	EPFL/ETHZ	Integrated water resources management
Module 7.6	5 ECTS	O	EPFL/ETHZ	Flood management and river training works
Module 7.7	5 ECTS	O	EPFL/ETHZ	Hydrology, water supply, drainage and sewer in urban areas
Module 8.1	5 ECTS	O	NUS	Hydrodynamics and Sediment Transport
Module 8.2	5 ECTS	O	NUS	Advance Finite Element Method
Module 3.3	5 ECTS	O	NUS	Neural Networks
Module 8.4	5 ECTS	O	NUS	Evolutionary Computation
Module 8.5	5 ECTS	O	NUS	Engineering Economics and Project Evaluation
Module 8.6	5 ECTS	O	NUS	System Modelling and Advanced Simulation
Module 8.7	5 ECTS	O	NUS	Decision Analysis
Module 9.1	3 ECTS	O	IITM	Dynamics of Ocean Structures
Module 9.2	3 ECTS	O	IITM	Port Planning and Development
Module 9.3	3 ECTS	O	IITM	Dynamics of Floating Bodies
Module 9.4	3 ECTS	O	IITM	Guidance and Control of Marine Vehicles
Module 9.5	3 ECTS	O	IITM	Nonlinear Problem in Ocean Engineering
Module 9.6	3 ECTS	O	IITM	Numerical Techniques in Ocean Hydrodynamics
Module 9.7	3 ECTS	O	IITM	FEM applied to Ocean Engineering
Module 9.8	3 ECTS	O	IITM	Advanced Wave Dynamics
Module 9.9	3 ECTS	O	IITM	Coastal Engineering
Module 9.10	3 ECTS	O	IITM	Plated Structures and Shells
Module 9.11	3 ECTS	O	IITM	Marine Foundations
Module 9.12	ECTS	O	IITM 3	Computer Aided Surface Development for Marine Vehicles
Module 9.13	3 ECTS	O	IITM	Advanced Marine Vehicles
Module 9.14	3 ECTS	O	IITM	Design of Coastal Structures
Module 10.1	5 ECTS	O	UNL	Groundwater uses
Module 10.2	5 ECTS	O	UNL	Hydraulic Systems Analysis
Module 10.3	5 ECTS	O	UNL	Irrigation & Drainage
Module 10.4	5 ECTS	O	UNL	Sanitary Engineering
Module 10.5	5 ECTS	O	UNL	Hydraulic Structures Design
Module 11.1	5 ECTS	O	UI	Urban waters modelling
Module 11.2	5 ECTS	O	UI	Hydroinformatics systems architecture
Module 11.3	5 ECTS	O	UI	Inland & Coastal Waters Management
Module 11.4	5 ECTS	O	UI	Decision Support System
Module 11.5	5 ECTS	O	UI	Sustainable Water Management

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

This course educates future developers and users of Hydroinformatics systems that are supporting management of the water environment in a sustainable manner worldwide. It has a solid foundation on the development of numerical, hydroinformatics and problem-solving skills which is attractive to industry. In addition, graduates are well-versed in the socio-economic and environmental disciplines which makes them very versatile and easily adaptable to changes in work environment.

Euro-Aquae is a unique degree designed for joint flexible delivery at a number of partner institutions, encouraging and requiring mobility of students. It is part of the Erasmus Mundus programme, a co-operation and mobility programme in the field of higher education which promotes the European Union as a centre of excellence in learning around the world.

Programme regulations (link to on-line version)

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

13 Criteria for admission

Entry qualifications

Admission to the Euro-Aquae programme conforms to the articles 2 and 11 of the Decision 2317/2003/EC of the European Parliament and of the Council of 5 December 2003 establishing Erasmus Mundus programme.

Students wishing to be accepted on to the MSc course should have a good (2.ii Honours or better) first (Bachelor) degree. Preferred first degree subjects are Engineering (any branch), Environmental Sciences, Physics, Computer Sciences, Geography, Mathematics, Chemistry, Geology or a similar subject. TOEFL score of 575 or greater (or IELTS 6.5 equivalent) is required, and basic knowledge of one of the others languages (German, French, Spanish, Hungarian) used by the consortium is required.

Students apply in the first instance to the coordinating institution, University of Nice–Sophia Antipolis (UNSA). Applications are sent by the coordinator to members of the Curriculum and Management Board. The applications are reviewed by all the board members including 2 external reviewers/experts. The board defines the final list of participants according to the following principles: Erasmus Mundus rules, excellence of candidates, motivation and professional objectives according to the specializations of the master.

Admissions policy/selection tools

Non-standard Entry Requirements

Applicants who hold non-standard qualifications, and/or have relevant experience, will be considered on an individual basis. Where possible, candidates will be given an oral interview.

Additional Requirements

Level of English Language capability
IELTS 6.5 (or equivalent)

14 Support for Student Learning

There are overall arrangements for student support at the partner Universities described below, as well as more detailed arrangements at UNUT described additionally. The Euro-Aquae *Curriculum and Management Board* is responsible for the overall running of the programme with a role equivalent to that of the UNUT Board of Studies.

At Newcastle University the Student Services portal provides links to key services and other information and is available at: https://my.ncl.ac.uk/students/

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.

On arrival at the University of Nice – Sophia Antipolis, students are provided with a set of general information about the university and the city of Nice. The faculty of Geographic Sciences with the cooperation of the department in charge of International Affairs of UNSA and CROUS provide support for all administrative procedures such as: housing, bank account, visas, residence permit, … Each participant receives a personal support according to his situation. International office provide additional social activities during the academic semester such as introduction to French language, visits of the city and of the region, participation to cultural

events. A specific social program is developed for the group of EuroAquae participants with the active participation of staff and students.
Before arrival at BTUC are recommended to contact the Institute Bauinformatik or the Akademisches Auslandsamt (Foreign Office) which will support visa procedure and housing if needed. On arrival the Akademisches Auslandsamt (Foreign Office) will support enrolment, opening bank account and introduce students to the University in general, its offices, library and social activities. Information about curriculum are provided during first week of teaching by the Institute Bauinformatik. AStudents Handbook will support students.
Akademisches Auslandsamt: http://www.tu-cottbus.de, click for International

On arrival at UPC, students are provided with a set of general information about the University. The Office for support of foreign students will provide some help on administrative and legal procedures (residence permissions, visas) as well as accomodation. Intensive courses on spanish languages are offered on September and January, according to the arrival time.

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 and help with academic writing is available from the Writing Centre (further information is available from the Robinson Library).

Additionally Euro-Aquae programme has a number of specific modules where Personal Transferable Skills, including Study Skills, are learned. These include EU-AQ-1.5-C(Web-based collaborative engineering), Research Introduction (EU-AQ-3.Y_E)and Pre-professional training (EU-AQ-3.Y_C)

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
At Newcastle University 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 e.g. 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.

At UNSA, all students enrolling on the course are assigned firstly, an overall course tutor, responsible for their overall development during the whole programme, and secondly a personal tutor whose responsibility is to monitor the academic performance and overall well-being of their tutees while at their institution. Additional supports in case of special needs can be obtained through social services of UNSA.

At BTUC the Institute Bauinformatik will nominate tutors for groups of students taking care of their personal and academic development. Tutors will advice for special programmes offered at the university and establish contacts correspondingly.

At UPC students are assigned a professor as a personal tutor. This activity is recognized as a teaching activity for the tutors. Erasmus students local organization provides support to new foreigner students.

Support for students with disabilities
The Newcastle 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.

AT UNSA, support for special needs can be obtained through the Acessibility Center and the Social services.

The personal tutors take care and provide information to access the right services.

At BTUC the nominated tutors will take care and provide support. For tutors please contact Institute Bauinformatik.

At UPC students with special needs are supported, through the new Accesibility Center created in 2005.

Learning resources
Newcastle 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.

Brandenburg Technical University Cottbus (BTUC) supports a web based collaborative platform (http://www.euroaquae.org/) providing a virtual environment where staff and students involved in the programme from all of the five institutions can communicate, collaborate and share programme documents and lecture notes besides the library and the computer pool support learning and training.

UNSA provides access to all libraries of the institution as well to the digital library with more than 20.000 titles available online for all students. (http://www.unice.fr/BU/docel.html). Individual digital environment is provided to all students through the Web portal of UNSA. For EuroAquae, the participants have the benefit of 2 "private" class rooms with computers available. An application server is established at UNSA and provide access to all EuroAquae participants to several modelling environments.

UPC provides ICT access through the Gabriel Ferrater Library, as well as through the computer room facilities located in the Campus Nord. Virtual Campus "Atenea" is the way students receive documents and information of the teaching modules.

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

Euro Aquae Programme review

The programme is fully integrated to the ECTS system according to the Bologna process and the national rules of each institution. The modules of the master course fully enter the quality assurance of each institution of the consortium. Moreover and to obtain a global vision of the curricula, the specific quality assurance of the course is supervised by the Curriculum and Management Board. The specific task of quality evaluation is made annually by 2 independent external experts (EE): one from academia (Prof.-em Dr. André Van der Beken, VUB – Brussels Cf. CV) and one from the profession (Dr. Jean Cunge, France Cf. CV), whose terms of reference for QA are described in Attachment 08.

The evaluation is based on a fourfold scheme:

- SCHEME A: evaluation by the stakeholders (Students S, Teachers T & Contractors C) through a self-assessment procedure; it summarises the opinions of those concerned on main points concerning quality of organisation, of teaching and didactic methodologies and activities during the Course, and on contractual and financial aspects in the case of the Contractors. SCHEME B: evaluation by the EE of the published information about the programme;
    - SCHEME C: evaluation by the EE through formal questionnaires for each module to stakeholders S and T.
    - SCHEME D: evaluation of adequacy between the course and the demands, both professional and academic; this will be done by the EE through reporting based on their personal experience and on the external opinions collected from the Profession and Academia.

The results of the evaluations are published by the board.

Procedures followed at UNSA
At UNSA, the master program is submitted by the university after internal evaluation to the Ministry of

Education every 4 years as part of the 4years contract established between UNSA and the Ministry of Education. The Ministry experts analyse quality, content and results of the program and deliver accreditation for the master degree (as national degree) with the Conseil National d'Evaluation (CNE). Every year evaluation is made by the Faculty of Geographic Sciences according to the UNSA scheme with the participation of internal and external experts. The councils of the university validate the results. The specific quality assessment structure developed for EuroAquae is fully integrated to the UNSA procedures and is strictly followed.

Procedures followed at BTUC
Within BTUC, the Board of Teachers of each curriculum reviews the degree programme.

Module reviews All BTUC modules are subject to review by questionnaires which are considered by the Quality Assessment Board of the university. New modules and major changes to existing modules are subject to approval by the Faculty Board and the International Curriculum Board of the Erasmus Mundus EuroAquae MSc "Hydroinformatics and Water Management" programme .

Accreditation reports This programme is not yet accredited by any professional body.

Student evaluations All modules, and the degree programme, are subject to review by student questionnaires. Informal student evaluation is also obtained at the Quality Assessment Board.

Procedures followed at UPC
At UPC, the local Agencia per la Qualitat del Sistema Universitari de Catalunya, AQU Catalunya, evaluates in a periodical basis the structure of all the curricula existing at the UPC. This process is made every 4 or 5 years, frist by mans of an internal committee, and finally and external committee compossed by an academic not related with the university under evaluation, an external expert from industry or administration, and a technician of the AQU agency. Every year, the UPC evaluates all Teachers and Modules through questionnaires, and the results are analysed by the Board of Studies and exposed to the university community. Moreover, the School of Civil Engineering selects internal experts in charge of the curricula coordination in several academic topics, Water, Transportation, etc.

Procedures followed at Newcastle University
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 Board of Studies and/or the School Teaching and Learning Committee. 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, Learning and Student Experience Committee.

Programme reviews
The Board of Studies conducts an Annual Monitoring and Review of the degree programme and reports to Faculty, Teaching, Learning and Student Experience Committee. The FTLSEC takes an overview of all programmes within the Faculty and reports any Faculty or institutional issues to the University 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, Learning and Student Experience Committee. External Examiner reports are shared with institutional student representatives, through the Staff-Student Committee.

Student evaluations
All modules, and the degree programme, are subject to review by student questionnaires. Informal student evaluation is also obtained at the Staff-Student Committee, and the Board of Studies. The results from student surveys are considered as part of the Annual Monitoring and Review of the programme and any arising actions are captured at programme and School / institutional level and reported to the appropriate body.

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

This degree programme is accredited as meeting the requirements for Further Learning for a Chartered Engineer (CEng) for candidates who have already acquired an Accredited CEng (Partial) BEng (Hons) or an Accredited IEng (Full) BEng/BSc (Hons) undergraduate first degree, for intakes up to 2011. See http://www.jbm.org.uk/ for further information.

Additional mechanisms

16 Regulation of assessment

Newcastle University
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.

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

i. See and approve assessment papers
ii. Moderate examination and coursework marking
iii. Attend the Board of Examiners
iv. Report to the University on the standards of the programme

Assessment at UNSA is regulated by the Council of the University in charge of Academic affairs. Marks are assimilated according to the ECTS grading scheme (A-F: 0-5) - are excellent (0 - A), very good (1 - B), good (2 - C), satisfactory (3 - D), sufficient (4 - E) and fail (5 – FX/F). Marks from each module are weighted by factors according to the ECTS credit value.

The marks from all modules will normally be 4-E or better for successful completion. Compensation between modules is offered for each semester. The re-assessment for all modules with grade 5 is offered each semester

UNSA applies a common marking scheme, which is specified in the Faculty marking criteria (See table bellow) and is based on descriptors for levels of achievement. The pass mark, for UNSA modules, is 10.

Mark Range	UNSA Brief Description	ECTS Class
19-20 18-18.9	Outstanding work throughout: excellent analysis, synthesis and evaluation of material and concise, logical thought. Shows originality and critical ability. Comprehensive understanding of topic, virtually no errors. Extremely well presented and structured work. Outstanding in most elements but minor deficiencies in some, compensated by excellence in others. Extremely well presented and structured work.	A - 0
16-17.9	Overall excellent. Thorough understanding of the topic. May contain minor errors. Extremely well presented and structured work.	B - 1
15 – 15.9 14 – 14.9	Shows thorough understanding of topic. Substantial detail, with evidence of further study. Very well presented and structured work. Work provides substantial information. May contain minor errors of understanding. Some evidence of additional study. Very well presented and structured work.	C - 2
12-13.9	Clear understanding. Material is relevant and largely correct, but lacking in critical analysis and in evidence of further study. May contain errors of understanding or facts compensated by very good work in other areas. Relies almost entirely on course material. Adequately presented and structured.	D-3
10-11.9	Limited understanding. Considerable omission of relevant material and/or use of irrelevant material. May contain significant errors of understanding and some errors of fact. Presentation and structure adequate to poor.	E – 4
9-9.9 8 -8.9	Very limited understanding of material. Significant omissions, errors of understanding and factual errors. Generally poorly presented and structured. Demonstrates minimum acceptable understanding in some though not all areas. Many factual errors and omissions. Generally poorly presented and structured.	FX -5
6-7.9 4-5.9 2-3.9 0-1.9	Generally irrelevant approach and failure to understand basic requirements. Significant errors. Little or no structure and poorly presented. Limited work showing an inability to deal with the requirements. Some factually relevant material. Extremely limited work with very little factually relevant material. Little or no attempt to complete the work.	F -5

Assessment at BTUC is regulated by the Board of Examiners of each curriculum. The regulation is to be found in Annex 1.

At UPC, assessment is made on the basis of a final test, complemented by continuous evaluation made by the professor through courseworks or partial tests. Written tests are the normal way used. Marks are from 0 to 10, and the student can re-take the exam few weeks after the first exam. If after these two exams the student does not pass, he must repeat module in the next semester.

In addition, information relating to the programme is provided in:
The University Prospectus: http://www.ncl.ac.uk/postgraduate/ The School Brochure http://www.ncl.ac.uk/marketing/services/print/publications/ordering/ Degree Programme and University Regulations: http://www.ncl.ac.uk/regulations/docs/ The Degree Programme Handbook: (available on the web internally)

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

Module			Intended Learning Outcomes			
code	**name**	**type**	**A**	**B**	**C**	**D**
CEG8501	Quantitative Methods for Engineering	Compulsory	3	1, 4	1	1, 4, 5, 7
CEG8503	Hydrosystems Processes & Management	Compulsory	1, 3	1 – 6	1- 4, 6	1 – 7
CEG8505	Climate Change: Earth System	Compulsory	1, 4	1 – 6	1- 4, 6	1 – 7
CEG8506	Hydrosystems Modelling	Compulsory	1, 3	1 – 6	1-3,6	1 – 7
EU-AQ-1.5-C	Web-based collaborative engineering	Compulsory	5	1,7	2-4	3-5,7
UNSA -1.1, EU-AQ-1.1-C, BUTE-1.1, UPC 1.1	Mathematics and Physics	Compulsory	1,3	1,4	1	1,2,5
UNSA-1.2, EU-AQ-1.2-C BUTE-1.2 UPC 1.2	Hydrology and Hydraulics; Hydrology Hydraulics & Water Resources	Compulsory	1,4	1-6	1	1,2,5
UNSA-1.3, EU-AQ-1.3-C, BUTE-1.3 UPC 1.3	Intro to Water and aquatic environment management	Compulsory	1,3	1-6	1	1,2,5
UNSA 1.4, EU-AQ-1.4-C, BUTE 1.4 UPC 1.4	Computer skills, databases & GIS-ICT; An intro to the fundamentals of GIS, Computation, Modelling and Statistics	Compulsory	3	1,4,5	1,2	3,5
CEG8512	Integrated River Basin Management	Compulsory	1 – 4	1 – 6	1-4,6	1 – 7
CEG8513	Hydroinformatics Systems Development	Compulsory	1, 3	1 – 5	1-3,6	1 - 7
CEG8515	Modelling of Floods	Compulsory	1 – 3	1 – 6	1-3,6	1 - 7
CEG8514	Climate Change: Vulnerability, Impacts	Compulsory	1, 4	1 – 6	1-4,6	1 – 7
CEG8516	Groundwater Modelling	Optional*	1-3	2-7	4-8	1-7
CEG8517	Computational Hydraulics	Compulsory	1,3	1 – 6	1-3,6	1 - 6
INU8001	Writing Dissertations in Science and Engineering	Compulsory				4
SPG8009	Renewable Energy: Policy, Politics and Ethics	Optional	2, 4	2 – 6	1, 3 – 6	1 - 6
CEG8502	Quantitative Methods for Engineering (flexible)	Optional	3	1,4	1	1,4,5,7
EU-AQ-3.X_E	Hydro-Europe Working as virtual company/institute	Compulsory	2-5	1,7	1,4,7	4-7
EU-AQ-3.Y_E	Research Introduction	Optional		5,6	6	1,3,4
EU-AQ-3.Y_C	Pre-professional training	Optional		5,6	6	1,3,4
UNSA 3.1	Modelling methods for urban waters	Optional	2-4	5,6	6	1-5

UNSA 3.2	Methods for water supply and waste water treatment	Optional	2-4	2-4	2-4	1-5
UNSA 3.3	Economical and legal environments – Water industry& municipalities	Optional	2-4	2-4	2-4	1-5
UNSA 3.4	Project Management and communication	Optional		2-4	2-4	4-7
EU-AQ-3.1-C	Coupling free-surface and groundwater modelling	Optional	2, 3	5,6	4,6	1-5
EU-AQ-3.2-C	Modelling business processes, workflow and information management	Optional	2, 3	2-4	2-4	1-5
EU-AQ-3.3-C	Geometric modelling and presentation methods	Optional	2, 3	2-4	2-4	3,5
EU-AQ-3.4-C	Monitoring, data acquisition and documentation	Optional	2,3	1,2	1,4	3,5
BUTE 3.1	Modelling methods for inland surface waters	Optional	2-4	1,3	1,4	1-5
BUTE 3.2	Hydrological modelling and forecasting	Optional	2-4	2-4	2-4	1-5
BUTE 3.3	River basin management and planning	Optional	2-4	2-4	2-4	1-5
BUTE 3.4	Advanced hydrometry and data analysis in surface waters	Optional	2-4	2-4	2-4	1-5
UPC 3.1	Artificial neural network for decision support systems	Optional	2,3	2-4	2-4	1-5
UPC 3.2	Flood risk concepts and application in river basin management	Optional	2,3	1-3	2-4	1-5
UPC 3.3	DSS for flood risk in urban areas	Optional	2,3	2-4	2-4	1-5
UPC 3.4	Real time control and operation of irrigation canals, rivers and reservoirs	Optional	2,4	1-4	2-4	1-5
EU-AQ-4.1_C	Research and development project	Optional	2-4	1-4	2-5	1-7
EU-AQ-4.1_E	Professional practice	Optional	2-4	1-6	1-6	1-7

*This module is taught in semester2 but it is only for students who did semester 1 at NU