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PREFACE

Why EuroAquae?

Evolution of human activities, development of technology and economic constraints, in the foreground of climate changes and growing earth population, induces situations more and more complex to manage. Sustainable development and, above all, management of water resources represent today and moreover within a foreseeable future a major challenge for postindustrial economy and urban social organization. The essential aim of such management is to minimize the risk of crisis - if possible to avoid them - in water supply and waste water treatment for population, in water scarcity for irrigation, in management of consequences of floods, etc.

Initiated in Europe more than 30 years ago, Hydroinformatics emerges as the central element for the progress of modelling activities and management of capacities, either on the theoretical side or in the operational field. Information and Communication Technologies (ICT) deeply extend the potential of tools; as well, they modify the engineering activities in the water field. Development of ICT allows for a synergetic use of simulation tools and communication technologies, within a single methodological approach dealing with physical, social and economical aspects. The only successful issue to the problems evoked above implies common views and actions of decision makers and users on one hand (population, governments, administration, elected bodies, NGOs...) and executive body on the other hand (engineering companies).

The added value of Hydroinformatics is precisely to make available the results of engineering thinking to decisions-makers and as well to make clear for engineers all the social requirements to be satisfied. Theoretically, this can be done thanks to the ICT. In practice, within administrations, within consulting institutions, within contracting enterprises, it means that there is a need for Hydroinformatics professionals able to develop a global understanding of problems and to implement water management with the necessary knowledge and ability.

There is a need for engineering professionals who not only know how to build a dam or water supply systems, but who are also able to talk to the outside world and to modify the surrounding professional environment by their ideas. These developments have to be done within the real European Union context, i.e. an international context regulated by common framework and interests. The reality of the needs for such professional profiles has been proven during the last years. Most of the first generations graduates of EuroAquae Master Course were offered immediate employment with European companies.

According to all analysis and previsions, the intensive demand in Hydroinformatics educated engineers and managers, both in public services and private sector, will continue for more than 5 decades. Accordingly, specialization and training of executive engineers and managers is the key issue for this needed progress. Although not always perfect, the European knowledge, know-how and good practices in sustainable water management and Hydroinformatics are nevertheless the major references. They constitute the central elements of a common technical culture in water engineering. Nowadays, this culture is widely requested and the demand will be (necessarily) growing in the future.

The water sector is a major economic domain in Europe and one of the most important public service provided to the communities. During the last decade, the water utilities, like Suez Environment or Veolia, have strongly invested and recruited numerous professionals. In parallel, it is really surprising to see the limited investment made by the educational environment in order to answer to the demands of the companies and more generally of the society. The educational sector in Europe is still offering “traditional curricula”, focused on disciplinary approach like hydraulics and fluid mechanics. It has difficulties to promote the multi-disciplinary and technical changes needed by the professional environment. Paradoxically, the number of offered curricula is globally decreasing face to an increasing demand. This situation has been pointed out by several European national entities (UK, France, Germany, Spain…), by third countries (India, Bangladesh, China, South Korea, Japan…), by international agencies (like UN-WMO) underlying the urgency to redevelop curricula in this field.
In order to structure and build the answer to these needs and to create as well a solid offer to cover the demand, EuroAquae Consortium has successfully established and promoted, since 2004 and within the Erasmus Mundus framework, the first ever created European joint MSc degree: "EuroAquae – Euro HydroInformatics and Water Management" [http://www.euroaquae.org].

Of course EuroAquae cannot pretend to answer all of the demands but the training provides a number of qualified graduates into the specific international Hydroinformatics field. At the international scale, the EuroAquae Master is the single 2 years master programme focused on Hydroinformatics and Water Management. The course presents a completely different approach from the traditional master courses dealing with water related topics. It's clearly the only one training which targets the best international professional level for leading engineering companies and water utilities.

The EuroAquae consortium is composed by:
- the 5 European universities – University of Nice-Sophia Antipolis (coordinating institution), Newcastle University, Technical University of Catalonia, Brandenburg University of Technology at Cottbus, Budapest University of Technology and Economics - who have created the master course and have been selected under Erasmus Mundus in 2004 and 2009;
- the 6 Third Country Higher Education Institutions – National University of Singapore, Indian Institute of Technology Madras, Incheon University, Swiss Federal Institutes of Technology Zurich and Lausanne, Universidad Nacional del Litoral - who have been associated to the EuroAquae consortium under the Erasmus Mundus since 2005 and 2009;
- 19 associated members mainly from the industrial water sector and international bodies who are contributing to the development of the master course programme.

The annual needs for professionals could be estimated to 50, at least, for the European Union and more than 300 worldwide concerning both initial and continuing education (long life learning program). The fact that all EuroAquae graduates have easily obtained a job contract is a positive indication in this sense. Accordingly, specialization and training of executive engineers and managers are the key issues for this needed progress. The European knowledge, know-how and good practices in sustainable water management and hydroinformatics are references and they constitute the central elements of a common technical culture widely requested. The EuroAquae partners share this vision and this ambition for the future.

The Master builds this vision, in a synergy way, from the major competencies of each academic partner and his professional environment, with the ambition to create a program able to cover successfully all mentioned aspects, to maintain and promote the essential research and development activities, at the highest level. The master is defined to welcome about 40 participants each year.

This handbook has been elaborated in order to provide to the participants all the requested and useful details for their 2 years in Europe with the EuroAquae consortium.

Acronyms
- UNS = University of Nice - Sophia Antipolis (France)
- BTUC = Brandenburg University of Technology at Cottbus (Germany)
- BME = Budapest University of Technology and Economics (Hungary)
- NU = Newcastle University (United Kingdom)
- UPC = Technical University of Catalonia (Spain)
- NUS = National University Singapore (Singapore)
- IITM = Indian Institute of Technology Madras (India)
- IU = Incheon University (Korea)
- ETH = Swiss Federal Institutes of Technology Zurich (Switzerland)
- EPFL = Swiss Federal Institutes of Technology Lausanne (Switzerland)
- UNL = Universidad Nacional del Litoral (Argentina)
ADMINISTRATION

I. CANDIDATURE AND SELECTION PROCEDURES

I.1 Criteria for Admission


Candidates must have a minimum of:

- A 2nd class degree from a recognised University (B.Sc.) or equivalent (minimum qualification for entry). Preferred first degree subjects are Engineering (any branch), Environmental Sciences, Physics, Computer Sciences, Geography, Mathematics, Chemistry, Geology or a similar subject. Advanced level Mathematics or equivalent is also normally required;
- Applicants from professional practice (continuing education) have to demonstrate professional experience as an engineer or similar of at least 5 years;
- Applicants for whom English is not their first language must provide evidence of a satisfactory command of English, preferably by means of a TOEFL (Paper Bases Test) score of 575 or greater, or by an IELTS score of 6.5 or greater;
- Basic knowledge and practice of one of the other languages (German, French, Spanish, Hungarian) has to be acquired during the 2 years program.

Applicants who hold non-standard qualifications, and/or have relevant experience, will be considered on an individual basis. They may be asked to take an oral interview.

Evaluation of the level of scientific and engineering knowledge, as well as the command of English of each candidate is made by the EuroAquae consortium.

I.2 Basic Knowledge Requirements

Applicants will be asked to take an entry test in mathematics to ensure sufficient mathematical background. The maths entry test is available on the website: EuroAquae Master course NU semester 1, prerequisites for semester 1 at:


I.3 Selection Procedure

In any one year the number of candidates who meet the minimum admission requirements is likely to exceed the number of places available.

Each application will be assessed on a scale of 1-20 by two Examination Board members at least, according to common criteria agreed by the Examination Board. Criteria are academic excellence, experience and skills in the water domain, professional experience, motivation, recommendation from referees, needs of professionals in the home country. Where deemed appropriate an oral interview may be held.

The results are reviewed by all members of the Examination Board including the two external advisors. The Consortium Board will determine the final list of students to whom places will be offered according to the following principles:

- Erasmus Mundus programme rules;
- Academic and professional excellence of candidates;
- Motivation and professional objectives according to the specialization of the applicant.

The list of successful candidates is prepared by the Coordinator on behalf of the consortium and the invitation to join the Master’s programme is issued after receiving the agreement of the
Commission of the European Union through Erasmus Mundus programme. Students are notified by the coordinating institution about the outcome of their applications.

The universities of the Consortium will normally confirm the selection of students recommended by the Examination Board and decided by Management Board. However each institution reserves the right exceptionally to refuse admission if a candidate does not meet its formal admission requirements.

I.4 Student Application

Documents to be submitted are:

- Application form, available on the EuroAquae website:
  
  http://www.euroaquae.org/jahia/page5137_en.html

- Short Curriculum Vitae (1 page)

- A description of previous academic programmes undertaken and of professional skills acquired.

- Degree certificates and any additional supporting documents (and for EU nationals when available the Diploma Supplement).

- Recommendation letters (2 referees, at least one of whom must be able to provide an academic reference) submitted by the referee directly to the Co-ordinator

- In the case of applicants in professional practice, a reference from the employer.

The application must be submitted in English.

Applications are to be received by a date annually fixed by the Management Board so as to meet application deadlines for financial support from the European Commission.

II. MANAGEMENT

II.1 Consortium Board

The EuroAquae Consortium Board (CB) consists of representatives of the partner Universities (members of the consortium) and co-opted Independent Experts charged with Quality Assurance. The Board manages the contract with the Commission of the European Union (EU), is the only interlocutor of the Commission, presents to the Commission reports and forthcoming proposals for financing of projects. The Chairman of the Consortium Board is the Coordinator of the EuroAquae Erasmus Mundus EU Project. The Consortium Board is responsible for the oversight of the management of the Project and for the overall running of the Project. It meets at least twice a year.

II.2 Management and Curriculum Board

The EuroAquae Management and Curriculum Board (MCB) is formed by:

- one representative from each Partner university, who are responsible for ensuring that the requirements of their home universities are met with respect to the Joint Degree agreement established between the awarding universities;

- one representative of the Alumni and Students Association (EAAA), recognised by the MCB, who shall serve for a period determined by the Alumni Association;

- two student representatives designated through the process defined within EAAA and accepted by the majority of participating students (year 1 & 2);

- two Independent Experts\(^1\), one from an academic background and one from a professional background, who shall serve for a period determined by the CB.

\(^1\) Currently these are Prof. P.E. O’Connel (UK) and Dr. J. Cunge (France), as nominated responsible for Quality Assurance in the EC-project application.

EuroAquae Handbook
The MC Board meets twice each year. The MC Board is responsible for the oversight of the administration and the curriculum of the programme. More in particular the MC Board:

- masters the validation of coherency of the curriculum,
- analyses the content of the modules and stimulates interaction among the teachers of the partner universities;
- proposes improvements for the coordination of the programme;
- discusses and helps to solve academic and administrative issues about students and teachers affairs, that are beyond the normal host university affairs.

The MC Board is chaired by the Coordinator of the EuroAquae Erasmus Mundus EU Project or by a member of the Consortium Board of the Project designated by the Coordinator.

II.3 Examination Board

Besides of local (European partner universities) Examination Boards who have full responsibilities and follow their own rules, EuroAquae has an overview Examination Board that is composed of representatives of the EuroAquae partner universities. The EuroAquae Examination Board (EB) meets as needed, recommends the selection of students, registers the results of the local Examination Boards and informs the Coordinator of EuroAquae to take action accordingly with respect to the continuation of the students’ programme. The EB takes the decisions on the student choices of the 3rd and 4th semesters.

The EB may discuss and arbitrate appeals or complaints of academic matters by students if requested by the host university. The Examination Board is chaired by a person appointed by the Consortium Board of the EuroAquae Project.

III. Support for students

III.1 Financial Support

EuroAquae Erasmus Mundus Master Course offers about 20 scholarships for 2 academic years (48,000 Euros for category A and 23,000 Euros for category B) to the students from outside of European Union as well as 15 scholarships to European Union students for mobility stays in third countries (outside of the EU). EU participants are also supported by Erasmus and others national grants.

The tuition fees for the non EU students are fixed to 16,000 Euros for 2 years for category A and 8,000 Euros for category B. The tuitions fees for the EU students without Erasmus Mundus grant are equivalent to the regular fees charged for the other master degrees (about 300 Euros per year). Accommodation and living expenses are not included.

The programme is also open to candidates who do not request financial support through Erasmus Mundus programme. For 15 European students, financial supports may be given.

Definition of category A and B can be found in the Program Guide of Erasmus Mundus

Category A: Non European Union students or "Third-country students" are defined as nationals coming from all countries other than the 27 EU Member States (Germany, Austria, Belgium, Denmark, Spain, Finland, France, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, the UK, Sweden, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Czech Republic, Slovakia, Slovenia, Bulgaria, Romania), the EEA-EFTA States (Island, Liechtenstein and Norway) and the candidate countries for accession to the EU (Turkey); who are not residents of any of the above countries; and who have not carried out their main activities (studies, work, etc.) for more than a total of 12 months over the last five years in any of the above countries.

Category B: European Union students and Non European Union students who are residents in one of the EU countries or who have not carried out their main activities (studies, work, etc.) for more than a total of 12 months over the last five years in any of the above countries.
III.2 Health and Safety for Students

All EuroAquae students have to be registered in a national health service in order to obtain registration at the participating universities.

If they are not using the health service of the first semester university, European students have to be registered in their national health service and should ask in their home country for the specific card showing that they are covered by the national health service of their own country, if this is the case. This allows students to register with a local doctor and provides free medical assistance in European Union member states.

For participants joining EuroAquae before September 2010, an insurance scheme is offered by the European Commission to the Erasmus Mundus third-country EU-funded students through the ACE Europe Insurance Company: it covers health, accidents, death, permanent invalidity and civil responsibility. The insurance cost is covered by the European Commission for the whole duration of the EuroAquae course (2 years). The Commission provides pertinent documentation for each EU-funded student to the coordinator; you will find your insurance certificate at arrival (a copy of it could be sent by e-mail if needed when applying for visa). Detailed description of the scheme and specific forms (such as claim forms) are available at the following website address:

http://ec.europa.eu/education/programmes/mundus/insurance_en.html

Other non-European students attending the course, or relatives who may come to stay, will have to make their own private health insurance arrangements.

For the participants starting in September 2010 and after, an insurance scheme will be proposed to all non–European participant by the EuroAquae coordinating institution. In addition, the participants will be strongly suggested to join the French national health service.

As previously, other non-European students attending the course, or relatives who may come to stay, will have to make their own private health insurance arrangements.

If you also have private health insurance in your home country you must bring the appropriate documentation with you. You must also bring a declaration from the European consulate of your home city or region stating that the insurance policy you have is valid in Europe.
I. AIM

The primary aim of the Programme has been to respond to the dramatic impact that Information Technology is having on water industry planning and operations. Hydroinformatics refers specifically to the application of sophisticated IT tools (e.g. GIS, simulation models, multi criteria analysis procedures, real-time control algorithms, expert systems, neural networks, etc.) to the planning and management of the water environment and water engineering infrastructure. Success in exploiting these tools requires training, not just in the technical aspects, but in handling the evolving changes to management and working practices that result from such innovation.

The aim of EuroAquae Master Course is hence to prepare and train future scientists and engineers in charge of modelling and managing projects in hydro-technologies and environment. These professionals can be involved in engineering/consulting activities in private companies, and are able to assist decision-makers of local, regional, national and international public bodies.

Their professional excellence is accompanied by the understanding of social and economic requirements that techniques should serve.

This programme therefore integrates knowledge and understanding of both water quantity and quality with the latest developments in information technology to improve technical and business decision-making within the water industry.

The Master Course within the Erasmus Mundus framework enhances the visibility and attractiveness of European higher education in third countries. It also provides EU-funded scholarships for third country nationals participating in the Master Course.

The Master Course 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.

II. OBJECTIVES

The consortium seeks to deliver the programme in the spirit of one European “virtual university”, with a high level of collaborative working in the delivery of teaching and of learning support.

The above aim of the EuroAquae master programme is realized through the following objectives:

- 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. Hence to develop and understand the skills needed to apply hydroinformatic tools and systems in the management/decision making processes within the water industry;
- to satisfy the professional development needs of the individual and his/her employers by preparing and training 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;
- to develop, for the teaching teams, experience in the planning and execution of extended research projects;
- to provide experience of dissertation writing and other presentational skills;
- to be part of the Erasmus Mundus programme, the European Union co-operation and mobility programme in the field of higher education;
- to provide a programme which meets the FHEQ (NU) at Masters level (Framework for Higher Education Qualification).
III. PROGRAMME INTENDED LEARNING OUTCOMES

The programmes provide opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributions in the following areas. The typical student will have:

A Knowledge and understanding

A.1. A sound scientific understanding of key basic subject areas of mathematics, physics, hydrology, hydraulics, Information and Communication Technologies (ICT), and geographic information systems (GIS).

A.2. 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.

A.3. Quantitative training in mathematical methods, computational modelling and hydroinformatics techniques.

A.4. Knowledge of specific examples of schemes for urban and rural water management.

B Subject-specific/practical skills

B.1 The ability to use ICT tools and hydroinformatics technologies;

B.2 Ability to design components of the water infrastructure and schemes for management of the water environment;

B.3 Practical testing of design ideas through computer simulation with technical analysis and critical evaluation of results;

B.4 Ability to evaluate critically the application of engineering and environmental techniques dealing with complex issues such as industrial, legislative and commercial constraints;

B.5 Planning, execution and reporting of a research project;

B.6 Ability to search for information and develop ideas further.

C Cognitive skills

C.1 Ability to select and apply appropriate mathematical methods for modelling and analysing relevant problems;

C.2 Use of scientific principles in the development of engineering and environmental solutions to practical problems in the water environment and water infrastructure operation;

C.3 Use of scientific principles in the modelling and analysis of the water environment and of water infrastructure operation;

C.4 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;

C.5 Originality in the creation of new products or methodologies or research outputs through synthesis of ideas from a wide range of sources;

C.6 Ability to produce solutions to problems through the application of engineering and water environment knowledge and understanding.

D Key (transferable) skills

D.1 Manipulation and presentation of data in a variety of ways;

D.2 Use of methods based on scientific evidence in the solution of problems;

D.3 Use of initiative, creativity and innovation in problem solving;

D.4 Effective communication in English (including written, oral and poster media);
D.5 Use of generic ICT, GIS and programming skills;
D.6 Independent learning and wider time and resource management;
D.7 Collaborative approach to team working and project management.

The above Learning Outcomes have been compared with the QAA Frameworks for Higher Education Qualifications Descriptor for a qualification at Masters (M) level. They are believed to meet or exceed the requirements of that Descriptor. A general table is presented in Appendix IV for all modules.

IV. ACCREDITATION

After the successful completion of the programme, the consortium issues a joint degree (MSc) defined as Master of Sciences in HydroInformatics & Water Management recognized by all the participating European countries.

An official attestation of completed degree (full legal value and never duplicated) is delivered to each graduated student during the Award Ceremony together with the Diploma Supplement that presents the details of the participant's academic programme and academic achievement.

The purpose of the Diploma Supplement is to provide sufficient independent data to improve the international ‘transparency’ and fair academic and professional recognition of qualifications (diplomas, degrees, certificates etc.). It is designed to provide a description of the nature, level, context, content and status of the studies that were pursued and successfully completed by the individual named on the original qualification to which this supplement is appended. It should be free from any value judgements, equivalence statements or suggestions about recognition.

The final degree certificate – parchment - is issued to individual students by the coordinating institution after the Award Ceremony. The certificate contains the logos of the five partner institutions. In order to receive the final degree, students have to return the official attestation delivered during the award ceremony.

The format of the Attestation and Diploma Supplement can be viewed in Appendix I.

V. QUALITY ASSURANCE AND COURSE EVALUATION

The Master Course is fully integrated to the European Credit Transfer System (ECTS) according to the Bologna process and the national rules of each institution. All modules, for all institutions, are associated to ECTS and evaluated with the "ABCDE grading scale".

For validation of coherency of the curriculum, improvement of content of the modules, coordination of the programme, standardisation of ICT support and mutual recognition within the consortium as well as for solving academic and administrative issues about students and teachers affairs the Management and Curriculum Board (MCB) is set up. On the MC Board, each university member of the consortium is represented by one member (designated as contact person for the project) or representative. The Board is complemented by two Independent Experts (IE) who are in charge of Quality Assurance (QA) and evaluation.

The modules of the master course fully enter the quality assurance process of each institution of the consortium. To obtain a global vision of the curricula, the quality assurance of the course is supervised by the MC Board. The specific task of Quality Assurance analysis is carried out annually and for each module by 2 Independent Experts (IE).

Quality Assurance activities are defined in details in Appendix II under the title “Terms of Reference for the Quality Assurance tasks of the Independent Experts”. The IE proceed in their task essentially through analyses and synthesis of anonymous questionnaires filled up by all stakeholders (students, teachers, Third Country scholars, professional practice tutors). The IE use, in their analyses, information gathered during MC Board meetings as well as information obtained through interviews and discussions with the stakeholders, including the Alumni Association. The QA purpose is to make sure that the project activities follow correctly their definition and proceed according to the objectives of the Course.

Independent Experts prepare each year two QA Reports based on questionnaires and other information:
an Interim QA Report, issued in March;
• a Final Annual Report, edited in September.

The QA Reports prepared by the IE and approved by the MC Board are parts of the outcomes of the Erasmus-Mundus project EuroAquae and are submitted by the Consortium Board to the Commission of the European Union.

VI. ACADEMIC CONTACTS

VI.1 The Degree Programme Directors

Degree Programme Directors are responsible for the day-to-day management of the degree programme at each location. They are responsible for the management of quality and enhancements of the degree programme, individually at their institution and jointly through the Management Board. The different Degree Programme Directors in the five partner institutions are:

Prof. Philippe GOURBESVILLE - Coordinator
Université de Nice- Sophia Antipolis (UNSA)
University of Nice - Sophia Antipolis
Polytech’Nice-Sophia
930, route des Colles
06903 SOPHIA ANTIPOLIS Cedex - France
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Apl. Prof. Frank MOLKENTHIN
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Brandenburg University of Technology Cottbus
Course Programme EuroAquae
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E-mail: Frank.Molkenthin@tu-cottbus.de
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Prof. Janos JOZSA
Budapesti Műszaki Es Gazdaságtudományi Egyetem Budapest (BME)
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Department of Hydraulics and Water Resources Engineering
Muregyetem rkp 3.
Budapest - Hungary
Tel.: +36 1463 1496
Fax: +36 1463 1879
E-mail: jozsa@vit.bme.hu
http://www.vit.bme.hu
VI.2 The Module Leaders

The degree programme is organised in modules or units of study. Each module has a designated leader and the name of this person is given on the Module Description for that module. The Module Leader is responsible for coordinating the teaching and assessment of the module. He should be the first point of contact for students with any problems or issues connected specifically with the module.

Module leaders and Module Descriptions are listed in Appendix III.

VI.3 The Personal Tutor

Each student is allocated a Personal Tutor on arrival at each University. The Personal Tutor should be the first point of contact when problems or issues arise, be they academic, personal or financial, and should be able to advise on these matters and be a source of sympathy and common sense when appropriate. The Personal Tutor will observe strict confidentiality about personal affairs and will represent the student’s interests in the event of any difficulties. This can only be done effectively if you keep in touch with your Personal Tutor at regular intervals, and consequently each University requires as a minimum each student to see his or her Personal Tutor at the beginning of each semester and at other times as the Tutor may request.

If for any reason you fail to attend lectures or assessments, or fail to perform satisfactorily, then you must discuss this with your Personal Tutor. If there is a satisfactory reason, your Tutor can apply on your behalf for a concession.

You must inform your Tutor of any illness as soon as possible, whatever the effects of the illness, on your studies.

Your Personal Tutor is the first and most important link with the University and you must maintain that contact. They cannot represent you if you do not speak with them. Remember, your Personal Tutor must be kept informed of your progress if they are going to be able to assist you.

VII. CAREER PLAN & CURRICULUM VITAE

During each semester all participants must write and update their Career Plan and their Curriculum Vitae.

The Career Plan consists in a letter addressed to the Examination Board that explains each particular student’s professional aspirations and projects. This is in the short term, i.e. wishes for the following semester; in the medium term: i.e. goals for the next few years after the course; in the long term, i.e. aspirations for his/her career within the next decade. The Career Plan is used to help the Examination Board to make informed decisions that will help the professional development of each individual participant. It is a very important tool for communication between
each student and the organisers of the course. It is also an opportunity for students to reflect and develop their professional aspirations.

Each student presents his professional project to all the members of the Examination Board, during its annual meeting (May, Newcastle University). The orientation for the specialisation 3rd semester is decided. Meanwhile at the same time, student have the opportunity to meet and to discuss with some representatives of the companies members of the Club of Friends.

This 2 days meeting are a leading edge in the master training.

N.B. The Career Plan is a flexible document that can be changed and updated at any time during the course. It is a private document, not published on the Website and known only to the Examination Board and to the student himself. It reflects to both Examination Board and the student the evolution of the student's outlook and projects.

The Curriculum Vitae is a document that enables the Student to make his skills and qualifications visible and it is required when completing job applications. All students participating in the Master Course must write a CV using a standard format, recognised by the European Union. Further information on how to write a CV can be found on the EuroPass website at:

http://europass.cedefop.europa.eu/europass/home/hornav/Introduction/navigate.action

Curriculum Vitae of former students can be viewed on the EuroAquae website, in the Alumni Association at:

http://www.euroaquae.org/jahia/page6392_en.html

VIII. PROFESSIONAL LINKS

VIII.1 Professional & research practice

Each Master 2 student (second year student) should spend a period of time (typically 5 to 6 months) working for a professional company, public service organisation or research institution during Semester IV. During this working experience, known as Professional Practice or Research Practice, a specific project will be developed, defined in cooperation between the student, Academic Tutor from one of EuroAquae partner universities and Institutional Tutor from the host institution (professional company, public service or research institute).

This professional or research practice is considered for the student as the first professional link with the Hydroinformatics community.

Students have to develop their strategy for professional or research practice during the semester III. In the both cases, they have to identified a project with a

VIII.2 EuroAquae Industrial partners

As illustration and example, below, are listed some company profiles where students in the past have spent semester IV, carrying out their professional practice period. Some of these companies, at the issue of semester IV, hired EuroAquae graduates as permanent employees. The companies are listed here to offer an example of the job market at which the course aims and are independent from the course itself:

- SUEZ ENVIRONMENT, ONDEO SYSTEM, LYONNAISE DES EAUX, CIRSEE, VEOLIA ENVIRONNEMENT, EDF, SOGREAH, CAPITA SYMONDS, HR WALLINGFORD, WALLINGFORD SOFTWARE, HALCROW GROUP, AMGA FOUNDATION, IRIDE AQUA GAS, DHI, SGAD, CETaqua, KISTERS FRANCE, DHI EAU & ENVIRONNEMENT, DHI Wasy …

Most of the companies listed are also Associated partners of EuroAquae consortium and members of Club of Friends (see below for presentation). The full list is provided in appendix IV
VIII.3 Job profiles in the Water sector

Job profiles in the water sector can be very diverse and can be described under many different titles: hydraulic engineer, water engineer, hydrologist, water resources manager, water consultant, etc.

Terminology such as junior, assistant, senior, supervisor, principal, deputy, head, director, general manager, etc., indicates the level of responsibility which will depend on maturity and expertise.

Each job will have its specific tasks or duties, depending on its location (office or site-based), the employment sector (government, consultancy, industry, research or academia, non-profit, etc.), and the level of responsibility: they will form an integral part of the job description, together with the required knowledge, skills and competency to fulfil the job.

Equally essential is the correct information about the supervision provided by the direct head and others above, and exercised towards subordinate staff. Higher responsibility means always less supervision provided, and more supervision exercised, and therefore the job will shift towards more managerial tasks with an ever increasing degree of competency for leadership in all aspects (long term planning of activities, administrative and financial planning and policies, human resources management and development, including selection, evaluation, promotion, assignment, disciplinary action, and training of employees, etc.).

Most jobs will involve significant liaison with businesses, the public and other professionals: explain plans, programs and projects at public and community meetings, legislative and administrative hearings, and related functions; attend conferences, meetings and seminars to keep informed of new developments.

A brief overview of typical job profiles is given here under, likely open to EuroAquae Alumni with an appropriate first-degree diploma, adequate experience, continuing education and permanent professional development. A useful website for more details is:

http://www.prospects.ac.uk/cms/ShowPage/Home_page/p!eLaXi

Hydraulic/Water engineer

A generic title given to engineers who specialise in water-based projects. Hydraulics engineers design, organise and supervise the building, maintenance and repair of projects such as dams and canals, and analyse natural water flow systems such as rivers and lakes. They also work on urban drainage, flood and storm water management projects. Water engineers generally deal with the provision of clean water, disposal of waste water and sewage, and prevention of flood damage. Asset management plays a major part in a water engineer's job. This involves repairing, maintaining and building structures that control water resources, e.g. sea defence walls, pumping stations, and reservoirs.

Tasks typically involve:

- designing overall schemes, such as canal systems, sewer improvement schemes or flood defence programmes, and associated structures, such as pumping stations, pipework, and earthworks (the scale of the design may range from an initial outline to a full, detailed design);
- preparing tender documents as a basis for construction;
- reviewing technical submissions;
- liaising with various bodies and individuals, including local authorities, government agencies, clients, contractors, residents, suppliers, technical experts and other consultants;
- keeping up to date with environmental matters, and being aware of policy and developments in this area;
- writing reports;
- presenting technical data or project results to both technical and non-technical clients and colleagues;
monitoring the progress of projects from beginning to end - from the feasibility stage, through design to construction and handover - or supervising one section of a large project;

- controlling budgets at project level;
- administering contracts and ensuring that work is completed to time;
- supervising the operation and maintenance of water and sewerage infrastructure;
- using computer simulations, to analyse, for example, potential dam failure;
- devising flood defence strategies, perhaps including river and flood plain modelling, economic studies, and consultation with affected people;
- monitoring flood levels at times of high risk;
- managing staff, including other engineers, technicians, and site workers.

**Hydrologists**

They are involved with the use and management of water and water resources in commercial, environmental or academic settings. They ensure the effective flow of water through channels and pipes for the engineering and control of water provision. Taking into account the utilisation of water in a specific natural drainage area ('catchment'), their work focuses on surface water, including rivers, lakes and glaciers, and on groundwater in the different geological substrata. Hydrologists use detailed data sources, computer modelling packages and other resources in order to maintain and develop successful water management strategies. They play a key role in ensuring the safe, environmentally sound and sustainable management of natural and domestic water resources. Work activities vary according to roles, but may include:

- working with specifically designed computer modelling packages to assess the most effective methods of managing available water in a particular area;
- analysing the effect of environmental changes on water flow;
- assisting in the planning of water resource development by forecasting and monitoring water usage and rainfall;
- estimating water yields, taking into account the utilisation of water in a specific natural drainage area ('catchment');
- assessing the relationship between rainfall, run off, and soil and rock features for the catchment;
- supervising well construction and monitoring groundwater flow;
- calculating and auditing water resource systems and analysing this data;
- determining licences for companies and bodies requesting to use surface water and groundwater resources;
- implementing relevant regulations;
- dealing with enquiries from external bodies and individuals, such as water regulators, consultants and researchers;
- project managing consultancies in installing new river flow gauges and groundwater monitoring networks;
- giving presentations at conferences;
- liaising with specialists, consultants and clients;
- providing feedback on drought and water resource plans produced by water companies;
- overseeing data collection on-site by hydrometrists and other staff;
- supervising the collection, processing and evaluation of data for water resource planning and flood management;
- applying hydrological and statistical techniques to water resource modelling and analysis;
undertaking hydrological modelling to allow flood forecasting and drought management strategy development;

- developing computer systems to improve the efficiency of data collection and analysis;
- investigating factors affecting acidity, nitrate levels or other diffuse pollution of surface- and groundwater;
- studying the effects of changes in land use on flows, for example urbanisation, afforestation or crop irrigation;
- planning responses to specific weather conditions, such as droughts and floods, and, in the event, assessing the impact on water catchments and supplies;
- keeping up to date with new research and techniques in all areas of hydrology.

**Water Resources and Conservation Engineering Manager or Director**

Direct, coordinate, and exercise functional authority for planning, organization, control, integration, and completion of engineering projects within the sector of Water Resources and Conservation, including utilities and administration. Review engineering design of all water distribution, storm water collection, and wastewater collection, treatment, recycling and disposal facilities; supervise the development of professional engineering and environmental studies; oversee planning for future needs of the water, surface water management, and wastewater treatment and recycling systems; coordinate the preparation of capital improvement programs and budgets; review and sign engineering drawings, contracts, work orders, change orders, and purchase orders; coordinate department activities; and assemble, organize, and present written and/or oral reports containing alternative solutions and recommendations regarding specific resources, plans, and policies. Evaluate and determine organizational needs and functional changes in order to improve efficiency and effectiveness of department; provide effective leadership in the development of new or improved procedures; analyze and review staff effectively.

**Water Utilities Manager**

Plans, organizes, coordinates and directs the daily operation of the water distribution and wastewater treatment facilities, including maintenance and repair of the sewer/storm water collection systems and potable water system; operates these facilities in compliance with quality requirements by law, ordinance or policy.

**Water Quality Scientist**

Responsible for the scientific analysis of water quality, including setting targets and standards derived from complex legislation that aims to safeguard all aspects of water quality. Water quality scientists compare test results with these standards, investigate shortfalls and take action to remedy problems. Depending on the employer, they may be involved in providing solutions to water quality problems, regulating water quality, or analysing existing water quality in one or all areas:

- drinking water;
- surface water (rivers, lakes, estuaries);
- groundwater.

Specific knowledge will be required for industrial applications.

**Ecological Engineer**

Plans, designs, and directs ecological engineering projects such as stream restoration, wetlands restoration, watershed planning and storm water management/treatment systems for development, and mine reclamation projects.
VIII.4 Club of Friends

The Club of Friends of the Course, jointly established by the EuroAquae Consortium Board and the concerned companies. The Club is composed of members that are experienced engineers and managers of industrial, engineering and consulting companies, utilities, regulatory and administrative bodies in local, regional or national governments (see Appendix. IV). The purpose of the Club is to create personal links between the Water Sector professional community and its future members, i.e. EuroAquae students.

Club of Friends members’ potential benefits are:

- access to the profiles of future specialists on the employees market;
- direct access to a source of recruitment of highly specialised graduates;
- participation to informal seminar meetings and discussions with students and their teachers as well as with other members of the profession, regulating agencies and development institutes; to create personal links and to obtain information on most recent practices, methods, tools and problems;
- ability to influence the choice of tools used during the Course, introduction into the course of useful paradigms in employment of the tools, as well as to influence the content of the Course.

EuroAquae in return expects participation and input of the Club members in several practical areas such as:

- express their points of view on the curricula and quality of the activities of the Project;
- help in finding training positions for the students during their last 6 months of the Course;
- supply speakers for specific lectures to the students on activities of industry and R&D institutions;
- participate, with other members of the Club, in periodically organised informal seminars to discuss with students the present and the future situation and needs of Hydroinformatics and water management in Europe;
- meet with students during the seminars or other informal meetings with the purpose to create personal links with students. To help students to integrate the profession and establish professional contacts even before they obtain the diplomas.

An important objective sought by the Club is not only to launch a bridge between specialised studies and professions interested in Hydroinformatics domain but also to make it clear to the profession that such links exist.

A list of the current members of the Club and more information about the Club can be found in the EuroAquae website, Alumni and Friends, Club of Friends, at:


VIII.5 EuroAquae Alumni Association

The EuroAquae Alumni Association (EAAA) was founded in February 2006 in order to create a wide network of EuroAquae students and graduates, share experience and provide mutual help within the EuroAquae community. The Association is a legal body governed by French legislation, run by students and graduates with support of the course organisers.

The EuroAquae Alumni Association (EAAA) aims to help EuroAquae students and graduates in their professional and academic development, to encourage sharing of experience and information, and to keep a link between generations and locations.

Within the EAAA, students have an opportunity to get and share useful information as well as tips concerning their study within the Master course, mobility, insurance, language, etc.

Through the EAAA alumni exchange information helpful to find jobs or research positions, investigate useful links and of course keep in touch with their ex-classmates.
Through EAAA website potential employers have access to related information on alumni professional profiles and can find people with required skills using the CV database or posting a vacancy advertisement.

The EAAA Forum is a place for friendly and open discussions on a variety of topics, from course management problems to organization of socials.

For further information on the EAAA services see Alumni Association webpage at:


VIII.6 Erasmus Mundus Alumni Association

The Erasmus Mundus Students and Alumni Association (EMA) is a network for students and alumni of all Erasmus Mundus Masters Course (EMMC) programmes. Since its establishment through an initiative of the European Commission in June of 2006, EMA has been working constantly to advance the Erasmus Mundus programme, and to offer a platform where students and alumni can exchange information and experiences. All EMA activities are performed by members on a voluntary basis, and in cooperation with the European Commission.

THE MISSION of the Association is to serve the interests of Erasmus Mundus Students and Alumni, notably by providing a forum for networking, communication and collaboration and by promoting Erasmus Mundus as a European programme of excellence in international education.

The EMA’s goals:

- Contribute to the successful internationalisation of higher education
- Create a representative network for Erasmus Mundus graduates from Europe and third countries
- Establish a channel of communication for students, alumni, their universities, and the European Commission
- Provide students with academic advice based on the experience of previous generations

All the EuroAquae participants are welcome to join EMA and to take part of the organized activities. Details can be found at:

http://www.em-a.eu
DEGREE PROGRAMME

I. COURSE STRUCTURE

The EuroAquae Master Course is a modular degree designed for flexible delivery at a number of institutions, allowing and encouraging mobility of students. EuroAquae is organised in partnership between the following European awarding universities:

- University of Nice - Sophia Antipolis (UNS, France) – coordinating institution
- Brandenburg University of Technology at Cottbus (BTUC, Germany)
- Budapest University of Technology and Economics (BME, Hungary)
- Newcastle University (NU, United Kingdom).
- Technical University of Catalonia (UPC, Spain)

The master’s programme is organised in 4 semesters, over 2 years. All courses within the partner universities are modular in form and EuroAquae MSc candidates must take a total value of 120 ECTS credits over the 4 semesters to fulfil the requirements of the MSc.

The programme is organized as a pedagogic continuum:

The course begins in September (semester I) of each year and takes the form of formal tuition, including fieldwork, lectures, tutorials, seminars and a work-based research project which will be reported in the form of a formal dissertation.

Students on the EuroAquae MSc can start semester I of their studies at any of the five partner universities. In semester II, all EuroAquae students attend Newcastle University. Semester III is offered only at the other 4 partner universities, while semester IV can be undertaken in industry or at any of the partner universities.

In each semester, students take 30 ECTS credits.

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. Students must follow at least 30% (1 semester) of the curricula in a different institution from their European home institution, where they spent Semester I. The mobility is applied in semesters II, III and IV.

II. WHAT IS AN ACADEMIC YEAR?

The 1st academic year for each generation participating in the course runs from the start of Semester I (September), until the end of Semester II (end of August).

The 2nd academic year starts again in the following September with Semester III and ends in September after completion of Semester IV.

It is the students’ responsibility to be available at any time during the academic year, particularly near the end, when they may be called upon re-sitting exams or to give oral presentations on their professional practice project. They must hence check the Academic calendar of each particular institution very carefully before planning holidays or booking return flights.

An overview of a typical EuroAquae academic year can be found in Appendix V.

III. WHAT IS A SEMESTER?

A semester is about a half of an academic year. The typical semester is structured as follows: registration and induction, followed by teaching and examinations. There will be periods of vacation generally at Christmas and at Easter, different for each partner institution.

Semesters I and III start in September and finish respectively in January and in early March. Semester II start in January and Semester IV begin in March. Semester II ends in August and Semester IV in September.
IV. WHAT IS A MODULE?

A module is a unit of study. The size of the module is indicated by its credit value under the European Credit Transfer System (ECTS). One ECTS equates approximately to 25 to 28 hours of study time. All participants study modules to a total credit value of 120 for the MSc programme. The number of taught credits in each semester is equal to 30. Each module consists of a mixture of lectures, practical, seminars, tutorials, independent learning, etc. and will be assessed before the end of the semester in which it was taken. Details about modules are provided in Appendix III.

V. SEMESTER I

Semester I (to be followed in any of the five partner universities) provides an introduction to hydroinformatics and common knowledge/soft skills required.

Prior to starting Semester I, students will be asked to undertake a preliminary test to certify their level of mathematical knowledge. The completion of this test is a prerequisite for starting Semester I.

Details of the test can be found on the EuroAquae website, Master Course, Semester I, NU, prerequisites at:


Material to prepare the test is also available on the EuroAquae website in the library section at:


In semester I of year 1, candidate take a total of 30 ECTS credits consisting of the following compulsory modules to value 6 ECTS credits.

V.1 Semester I Degree Programme Specification

In semester 1, candidates should take the following “horizontal” compulsory modules:

<table>
<thead>
<tr>
<th>Code</th>
<th>ECTS Credits</th>
<th>Sem</th>
<th>Comp/Opt</th>
<th>Institution</th>
<th>Descriptive title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
<td>2</td>
<td>1</td>
<td>C</td>
<td>Any</td>
<td>Web-based collaborative engineering</td>
</tr>
<tr>
<td>1.6</td>
<td>4</td>
<td>1</td>
<td>C</td>
<td>Any/NU</td>
<td>Language skills</td>
</tr>
</tbody>
</table>

N.B.: The students may follow during Semester I another language course (one of EuroAquae Partner’s official languages, i.e. Spanish, French, German or Hungarian).

and the compulsory modules to the value of 24 ECTS credits at any one selected institution as follows.

<table>
<thead>
<tr>
<th>Code</th>
<th>ECTS Credits</th>
<th>Sem</th>
<th>Comp/Opt</th>
<th>Institution</th>
<th>Descriptive title</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNS-1.1</td>
<td>6</td>
<td>1</td>
<td>C</td>
<td>UNS</td>
<td>Mathematics and Physics</td>
</tr>
<tr>
<td>UNS-1.2</td>
<td>6</td>
<td>1</td>
<td>C</td>
<td>UNS</td>
<td>Hydrology and Hydraulics</td>
</tr>
<tr>
<td>UNS-1.3</td>
<td>6</td>
<td>1</td>
<td>C</td>
<td>UNS</td>
<td>Introduction to Water and aquatic environment management</td>
</tr>
<tr>
<td>UNS 1.4</td>
<td>6</td>
<td>1</td>
<td>C</td>
<td>UNS</td>
<td>Computer skills, databases &amp; GIS-ICT</td>
</tr>
<tr>
<td>EU-AQ-1.1-C</td>
<td>6</td>
<td>1</td>
<td>C</td>
<td>BTUC</td>
<td>Mathematics and Physics</td>
</tr>
<tr>
<td>EU-AQ-1.2-C</td>
<td>6</td>
<td>1</td>
<td>C</td>
<td>BTUC</td>
<td>Hydrology and Hydraulics</td>
</tr>
<tr>
<td>EU-AQ-1.3-C</td>
<td>6</td>
<td>1</td>
<td>C</td>
<td>BTUC</td>
<td>Introduction to Water and aquatic environment management</td>
</tr>
<tr>
<td>EU-AQ-1.4-C</td>
<td>6</td>
<td>1</td>
<td>C</td>
<td>BTUC</td>
<td>Computer skills, databases &amp; GIS-ICT</td>
</tr>
</tbody>
</table>
VI. SEMESTER II

Semester II (to be followed at NU by all participants) concentrates on the acquisition and use of hydroinformatics concepts, methods and tools.

Soon after the arrival of all students, prior to starting the teaching of Semester II, participants will be asked to undertake a mock exam to certify their level of knowledge in basic subjects taught during Semester I. The mock exam is compulsory but its outcome is not a prerequisite for starting Semester II.

Material to prepare Semester II is available on the EuroAquae website in Semester I, NU resources at:


At Newcastle all participants will take a test in English to validate module 1.6 Language skills. The results of the English assessment will be sent back to each home institution where students have completed semester I in order to accredit the 4 ECTS of module 1.6 Language Skills. The students who fail the English assessment will have to follow an English language course to improve their Language skills. Courses will also be available for other students who wish to improve language skills in English or other languages in the consortium.

For further information on available language courses, see Language Centre and Centre for Lifelong Learning in Newcastle University.

VI.1 Semester II Degree Programme Specification

In semester II of year 1, candidates should take 30 ECTS credits at NU:

<table>
<thead>
<tr>
<th>Code</th>
<th>ECTS Credits</th>
<th>Sem</th>
<th>Comp /Opt</th>
<th>Institution</th>
<th>Descriptive title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIV8501</td>
<td>5</td>
<td>2</td>
<td>C</td>
<td>NU</td>
<td>Hydroinformatics &amp; Integrated River Basin Management</td>
</tr>
<tr>
<td>CIV8510</td>
<td>5</td>
<td>2</td>
<td>C</td>
<td>NU</td>
<td>Numerical methods &amp; computational hydraulics</td>
</tr>
<tr>
<td>CIV8506</td>
<td>5</td>
<td>2</td>
<td>C</td>
<td>NU</td>
<td>Introduction to software packages / Modelling of Floods</td>
</tr>
</tbody>
</table>
### VII. SEMESTER III

Semester III (to be followed in any partner university location except NU) delivers a thematic specialisation: hydroinformatics systems, urban waters management, inland waters management, decision support systems.

For the Examination Board, in order to decide for Semester III locations, Career Plans and Curriculum Vitae of participants will be considered. In addition, formal interviews with each candidate are carried out by the Examination Board during semester II. The interview is an opportunity offered to each EuroAquae student to discuss their professional prospects with the Examination Board.

Semesters 3 & 4 could be partly realized via a placement with one of the Third Country institutions (max 15 ECTS) and according to a pedagogic agreement.

### VII.1 Semester III Degree Programme Specification

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

<table>
<thead>
<tr>
<th>Code</th>
<th>ECTS Credits</th>
<th>Sem</th>
<th>Comp /Opt</th>
<th>Institution</th>
<th>Descriptive title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU-AQ-3.X_E</td>
<td>6</td>
<td>3</td>
<td>C</td>
<td>All</td>
<td>Hydro-Europe Working as virtual company/institute</td>
</tr>
<tr>
<td>EU-AQ-3.Y_E</td>
<td>6</td>
<td>3</td>
<td>O</td>
<td>All</td>
<td>Research Introduction</td>
</tr>
<tr>
<td>EU-AQ-3.Y_C</td>
<td>6</td>
<td>3</td>
<td>O</td>
<td>All</td>
<td>Pre-professional training</td>
</tr>
<tr>
<td>UNS 3.1</td>
<td>5</td>
<td>3</td>
<td>C</td>
<td>UNS</td>
<td>Modelling methods for urban waters</td>
</tr>
<tr>
<td>UNS 3.2</td>
<td>3</td>
<td>3</td>
<td>C</td>
<td>UNS</td>
<td>Methods for water supply and waste water treatment</td>
</tr>
<tr>
<td>UNS 3.3</td>
<td>5</td>
<td>3</td>
<td>C</td>
<td>UNS</td>
<td>Economical and legal environments</td>
</tr>
<tr>
<td>UNS 3.4</td>
<td>5</td>
<td>3</td>
<td>C</td>
<td>UNS</td>
<td>Project Management and communication</td>
</tr>
<tr>
<td>EU-AQ-3.1-C</td>
<td>6</td>
<td>3</td>
<td>C</td>
<td>BTUC</td>
<td>Coupling free-surface and groundwater modelling</td>
</tr>
<tr>
<td>EU-AQ-3.2-C</td>
<td>4</td>
<td>3</td>
<td>C</td>
<td>BTUC</td>
<td>Modelling business processes, workflow and information management</td>
</tr>
<tr>
<td>EU-AQ-3.3-C</td>
<td>4</td>
<td>3</td>
<td>C</td>
<td>BTUC</td>
<td>Geometric modelling and presentation methods</td>
</tr>
<tr>
<td>EU-AQ-3.4-C</td>
<td>4</td>
<td>3</td>
<td>C</td>
<td>BTUC</td>
<td>Monitoring, data acquisition and documentation</td>
</tr>
</tbody>
</table>
### VIII. SEMESTER IV

Semester IV (all locations) consists in a research project or professional practice project, both resulting in the MSc thesis during semester IV, all students are assigned an Academic Tutor to advise on the work-based dissertation and any issues that may arise during the programme. In each institution (professional or research) an Institutional/Professional Tutor (IT) is appointed for each student to supervise, advise and direct the work within the institution. All students are required to discuss their pattern of study with their Academic Tutor to ensure that they are following an appropriate programme. Indeed, the MSc diploma can only be granted if Examination Board considers that the work carried out during semester IV and the dissertation presented at the end of the semester IV satisfy the academic requirements of the degree.

In order to prepare for semester IV a career plan – previously defined - enables students to fulfil their professional ambitions.

It is expected that the students will define the semester IV arrangements with all concerned (Company or Public Service, Research institution, Academic Tutor, Institutional Tutor, domain of professional practice or project subject) by 15th January at very latest. If they have difficulties, they have to alert immediately EuroAquae coordinator and academic tutor from his semester III university.

After 2 weeks, each participant has to submit an inception report presenting in details of the project developed during the semester IV. This inception report has to be validated by the Academic Tutor and Institutional Tutor before to be uploaded on the EuroAquae platform.

The MSc thesis defence is organized jointly by the Academic and Institutional Tutors according to the rules of the host university and at the latest, late August. The MSc submission to the jury has to be done according to the rules of the host university with at least 2 hard copies and a digital version of the thesis. A hard copy and the digital version have to be sent to the EuroAquae coordinator. The MSc defence is based on an oral presentation – from 20 to 30 minutes – supported with a digital presentation (e.g. MS PowerPoint, PDF, Web-based or OpenOffice). After defence, the thesis and the digital presentation have to be uploaded on the EuroAquae platform.

### VIII.1 Professional practice

The professional practice is carried out within a company or a public service, on a specific project defined in cooperation between the student, Academic Tutor (AT) from one of EuroAquae partner universities and Institutional Tutor (IT) from the host institution (professional company, public service). The place of professional practice as well as the project subject must be approved by the chairman of the Examination Board. The project carried out by the student will be part of the

<table>
<thead>
<tr>
<th>Code</th>
<th>Code</th>
<th>ECTS Credits</th>
<th>Sem</th>
<th>Comp /Opt</th>
<th>Institution</th>
<th>Descriptive title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 3.1</td>
<td>6</td>
<td>3</td>
<td>C</td>
<td>BME</td>
<td>Modelling methods for inland surface waters</td>
<td></td>
</tr>
<tr>
<td>BME 3.2</td>
<td>4</td>
<td>3</td>
<td>C</td>
<td>BME</td>
<td>Hydrological modelling and forecasting</td>
<td></td>
</tr>
<tr>
<td>BME 3.3</td>
<td>4</td>
<td>3</td>
<td>C</td>
<td>BME</td>
<td>River basin management and planning</td>
<td></td>
</tr>
<tr>
<td>BME 3.4</td>
<td>4</td>
<td>3</td>
<td>C</td>
<td>BME</td>
<td>Advanced hydrometry and data analysis</td>
<td></td>
</tr>
<tr>
<td>UPC 301</td>
<td>3</td>
<td>1</td>
<td>C</td>
<td>UPC</td>
<td>Artificial neural network in decision support systems</td>
<td></td>
</tr>
<tr>
<td>UPC 302</td>
<td>5</td>
<td>1</td>
<td>C</td>
<td>UPC</td>
<td>Flood risk concepts and application in river basin management</td>
<td></td>
</tr>
<tr>
<td>UPC 303</td>
<td>5</td>
<td>1</td>
<td>C</td>
<td>UPC</td>
<td>Floods and urban drainage</td>
<td></td>
</tr>
<tr>
<td>UPC 304</td>
<td>5</td>
<td>1</td>
<td>C</td>
<td>UPC</td>
<td>Real time control of hydraulic systems</td>
<td></td>
</tr>
</tbody>
</table>
regular activities of the company or public service. Professional practice is considered as a first professional experience as executive engineer in Hydroinformatics and Water management.

The evaluation and the validation of the module are made mainly through professional criteria with attention paid to scientific aspects. The work is concluded by a portfolio that contains a formal report (thesis) that describes the work done in the project and an in-depth review of at least one associated topic (this report is a dissertation required for partial fulfilment of MSc degree requirements) as well as the details of lessons learned. The work is concluded by a public presentation of the dissertation before the examination committee appointed by EuroAquaEx Examination Board. The professional practice is carried out in a European company or a European public service. The operational organization of this module is made by UNSA, acting as the host institution and with the full participation of all the consortium members. The validation (30 ECTS) of the module is made by UNS.

To find adequate European company or public service where they would spend their Semester IV, the EuroAqua participants should actively contact professional companies and institutions of their choice starting from Semester II and III, with the support of the EuroAquaEx Management Board. Professional advice will be given at any stage of the course and seminars could be organised to present companies’ profiles. Students may also have meetings with professionals working in the water industry at various times during the programme.

VIII.2 Research project

The Research & Development Project orientation allows the participants to obtain a capacity in a specific scientific or technology-based field in relationship with the most significant issues in Hydroinformatics. The definition of the master work in research area is made in dialogue between the student, a mentor from the host institution of semester IV, a supervisor from the coordinating institution and possibly with an external partner of the water field (industrial, consulting company, public services...). The research project is carried out in the research environment of the consortium members.

For the participants hosted by NU for semester I, the institution for the Semester IV must be different from NU. The work is concluded by a written dissertation report (thesis) considered as partial fulfilment of MSc degree requirements. The thesis is presented in public before the examination committee appointed by EuroAquaEx Examination Board. The operational organization of this module is made by BTUC, acting as the coordinating institution and with the full participation of all the consortium members. The validation (30 ECTS) of the module is made by BTUC.

VIII.3 Semester IV Degree Programme Specification

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

<table>
<thead>
<tr>
<th>Code</th>
<th>ECTS Credits</th>
<th>Sem</th>
<th>Comp /Opt</th>
<th>Institution</th>
<th>Descriptive title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU-AQ-4.1_C</td>
<td>30</td>
<td>2</td>
<td>O</td>
<td>Any</td>
<td>Research and development project</td>
</tr>
<tr>
<td>EU-AQ-4.1_E</td>
<td>30</td>
<td>2</td>
<td>O</td>
<td>Any</td>
<td>Professional practice</td>
</tr>
</tbody>
</table>
DEGREE PROGRAMME DELEVERY AND ASSESMENT

I. TIMETABLE

The calendar for a typical academic year can be found in Appendix V. The current academic year is described on the EuroAquaee website.

Each location will provide students with a timetable for each Semester. On the timetable, individual teaching activities described using the coding system of the individual universities will be found, including:

- The Module Number and the Module Name of the course to be followed;
- Duration time and place of each session;
- Whether the teaching will consist of: lecture, practical class, computer class, tutorial class, seminar class or a field class.

On-line timetables are available on the partner universities websites at:

- UNS: [http://edt.polytech.unice.fr](http://edt.polytech.unice.fr)
- BTUC: [http://euroaquae.tu-cottbus.de](http://euroaquae.tu-cottbus.de)
- BME:
- NU: [http://www.ncl.ac.uk/timetable/academic/](http://www.ncl.ac.uk/timetable/academic/)
- UPC:

Students should note that the absence of specific timetabled work does not mean that they will not be expected to be engaged in academic activities.

II. TEACHING AND LEARNING

II.1 Teaching

A variety of teaching and learning methods are used in order to fulfil the aims and objectives of the degree programme. Teaching is delivered by a mixture of conventional taught modules and intensive one-week residential courses, both of these comprising lectures and tutorials.

**Lectures** are used as the primary means of imparting core knowledge. Students are requested to be on time. Lectures are usually fairly formal and allow students to appreciate the fundamentals of a subject and to take notes on particular topics. Lecture notes are normally supplemented by additional handouts, such as copies of the overheads used in the lectures and/or relevant reference material. Slides, videos, computer screen projection and exhibits are also used, as appropriate. Students should feel free to interrupt the lecturer to ask for clarification of points or for a repeat of key ideas, while remembering that the lecturer has a schedule to keep to, so that some questions may be best raised immediately after the class.

For many modules, lectures are backed up by **seminars** and **tutorials**. These are less formal and could involve small groups of students. Seminars, where appropriate, involve presentations by students, discussion and analysis. Tutorials generally provide opportunities to discuss specific questions arising from lectures or focus upon problem solving. Students will also experience practical application of the material, computational work, or field work.

The opportunity for **Self Learning** begins before the start of the course and the need for self learning increases as the degree programme progresses. All students and more specifically those coming from other backgrounds than engineering, are required at all times to revise and where necessary supplement, their knowledge of basic subjects, necessary for the positive completion of the EuroAquaee Master Course, especially Mathematics and Applied Mathematics, Hydrology and Hydraulics. All accepted candidates for EuroAquaee course receive at their home location, during the summer preceding the semester I, list of materials that contain basics they should know. Resources are available through the EuroAquaee website, in the library section, at:

Lecture notes and resources posted by the various partner universities on the EuroAquae website can also be used to acquire further knowledge.

**Key transferable skills** are taught, practised and assessed within the degree programme and all students are encouraged to develop a range of such skills and abilities. Development of these skills requires a conscious effort on the part of the student in the same way as other learning. These skills are of particular interest to prospective employers, and they will seek to determine how well you have developed yours as part of their selection process. Any students who have had little practice with using IT should make a particular personal effort to familiarise themselves with the programs encountered during the course.

**Computer-based teaching and learning** has a significant role and students are directed towards appropriate packages on various topics to augment other forms of teaching. In addition, Managed Learning Environments, such as the EuroAquae website and platform, must be used as a web based resource and learning facility that allows students to study at any time during the course.

**II. 2 Learning**

**Study Skills.** Everyone has their own optimum way of working which changes according to the learning environment and experience. There is no one way of studying which can be guaranteed to work for all students; just as there is no 'best' lecturing style. You must develop your own study skills, which may be different for each module and change as you proceed through the Degree Programme. Try different techniques and select the best for you.

**Time Management.** You have made a commitment to attend lectures, tutorials, and site visits, and to engage in private study, and it is necessary for you to do so in order to complete the Degree Programme. In addition, you are expected to maintain regular contact with your Tutor who will monitor your progress and advise you on personal and academic matters. Your lecturers will give you assignments which can take several forms. All work must be submitted by the date specified.

Apart from these commitments your time is your own. You have to fit in a social life, coursework, private study, meals and "housework". Sometimes this may mean little time for sleep! It is important for your health and studies that you plan your day, week and semester and make the most of your Postgraduate University life. You will make many new friends, enjoy a range of activities and hopefully look back at your time during EuroAquae as one of the best in your life.

**Note Taking.** This is your own personal record of all spoken or written information given to you throughout your Degree Programme. Notes will be used to complete coursework and revise for exams. It is a skill you must master rapidly, especially as most of the time you will be communicating in a language different from your own and which will be of use throughout your professional career. Even if the lecturer provides some notes for you, it is always best to rely on your own notes because you develop a technique of recording information that you think is most relevant, and the lecturer’s notes will only ever be a summary of what was said in the lecture. Notes should be made for any formal contact time (e.g. lectures), technical meetings with staff, site visits, field trips and practicals. They should be enhanced by reading relevant references (you will receive guidance on the most appropriate sources). Remember for each hour of lectures you are expected to do at least one hour of related private study. If you encounter language difficulties in following any activity, it is your responsibility to make it known so that concepts can be clarified to you.

Good notes (and those which will help you most when revising) include headings and subheadings, highlighting and a clear layout. This may require reworking of the notes you made initially, and rewriting always helps you to remember. Develop and use your own abbreviations for words that appear regularly. You should aim to understand the lecture and your notes should reflect that understanding.

**Learning Aids.** For each subject that you will be taking there are probably dozens of textbooks which might be relevant to that subject. However, as you know, most books are expensive.

All students obviously need to buy some books, because you cannot always rely on the book you want from the library being available, especially when many other students need the same book. You may also want to start a collection of your own reference books for when you embark on your
career. You can be sure that the cost of books will continue to rise, so if you buy books wisely now it will be an investment for the future.

Lecturers for each module will try to help you to choose the most useful books for their particular module by providing lists of recommended textbooks. Some lecturers have developed their own set of notes which are to help you in a module. They are not a replacement for books, but a student aid. The lecturers are requested to upload their course notes and other useful documents, on EuroAquae website after the completion of the course. All the EuroAquae students have an access to these extremely important updated data base.

III. ASSESSMENT

Performance is assessed through a combination of written examinations, oral examinations and various forms of coursework, such as projects, practical reports and essays. The form of the assessment and duration of any written examination are given for each module on the relevant module description, which can be found in Appendix III. For most modules, the assessment procedure depends on the nature of the material offered by the module, and is set to provide a good balance between different modes of assessment. Students should endeavour to perform well in all forms of assessment.

III.1 Coursework

Practicals, coursework and their assessment are an essential part of the teaching of many modules. Your lecturers will give you coursework which can take several forms. It must be submitted by the date specified; otherwise it will attract a penalty.

Coursework is seen as a very important part of the education process. The coursework element derives from practical or design work and assignments carried out during the module. These assignments test combinations of knowledge, skills and attitudes, and are less of a test of memory than are exams. The rules for the submission of coursework are detailed below.

When a submission for assessment is required, this will, unless very clearly specified, be on an individual basis. If it is not clear whether or not a submission is required and what form it should take, advice should be sought immediately. Notes on plagiarism are given elsewhere in this handbook and it is important to note the penalties available against those guilty of such practices.

The date that a submission is due will be made clear at the time the coursework is issued. Students must treat all deadlines as final, and may not assume that work submitted late will be accepted. Subject to this, Module Leaders may, at their discretion, accept work up to one week after the deadline, possibly with the imposition of a penalty in the form of a reduction in marks. Students who do not submit coursework on time because of mitigating circumstances should note that they are expected to submit their work at the next available opportunity – usually a revised submission date will be negotiated between the student and the Module Leader. Details of the revised submission date, and the reasons this concession was granted, should be made known to your Personal Tutor. If the work is submitted late and is not accepted following these guidelines, or if the work is not submitted at all, a mark of zero shall be recorded.

For Submission and Return of Coursework you must follow the guidelines of each host institution:

- **UNS**: Coursework has to be submitted and returned on time by the students through electronic files to the concerned lecturers. Exceptionally, coursework will be submitted in A4 format paper.
  
  http://www.euroaquae.org/ (private login, available for all the students)

- **BTUC**:
  
  http://euroaquae.tu-cottbus.de
  http://www.euroaquae.org/ (private login, available for all the students)

- **BME**:
  
  http://www.euroaquae.org/ (private login, available for all the students)
**NU:** The School of Engineering and Geosciences at Newcastle University has a Quality Procedure for Coursework which monitors submission and collection of coursework and allows feedback to students. This can be viewed on the CeG student web site at https://www.ceg.ncl.ac.uk/students/. You will be required to complete the appropriate forms which accompany your coursework at the time the coursework is set.

All coursework submissions should be in A4 format. **For coursework submissions up to 10 sheets** these may simply be accompanied by a covering front sheet (for template see https://www.ceg.ncl.ac.uk/students/) and stapled in the top left hand corner. **For submissions of more than 10 sheets** they should be bound with a special School front page and plain back – these will be given out to all students at registration, free of charge, in packs of 5. Once you have used these, you may obtain a further set from either the Coursework Office or School Office Reception, again free of charge.

All coursework should be submitted via the labelled submission boxes just outside the Coursework Office (which faces into the Student Common Room in the Cassie Building). You should **complete the triplicate Assignment Submission Form** prior to submitting your work, ensuring that all details are written on the form using a biro (not a gel pen or rollerball pen). The Coursework Officer will sign the top sheets of these forms when she empties the submission boxes, and will post your copy in your student pigeon hole. All marked coursework should be collected from the Coursework Office. Hours of opening are 11:15 – 13:45 every day. All marked coursework will be returned to you via that room. It is important that you collect your coursework regularly since it allows you to monitor your progress and discuss problems you may have with members of staff. All returned coursework must be signed out by the Coursework Officer. The feedback on coursework must be read carefully as this is one of the main ways in which staff can advise students about their general progress and standard of work.

The aim of School staff is to have submissions marked and returned, with appropriate feedback, within four weeks of the date on which the last bit of coursework is due to be submitted, unless stipulated at the time of setting. For practicals done in small groups this will be some time after some groups have completed the practical. Coursework completed in UN by EuroAquae students has to be returned to Pauline Young in the School Office.

**It is essential that you retain all coursework for resubmission – do not discard any coursework during the time you spend at NU.** All assessed coursework for the Semester should be resubmitted to be available for inspection by the External Examiners. The onus of responsibility for retaining such work is on students.

All coursework will be retained in your Student file in the School Office for one year after your Degree and then it will be destroyed. If you would like coursework to be returned to you, you should apply for the return of coursework to Pauline Young no later than Easter of the Academic year after your graduation.

http://www.euroaquae.org/ (private login, available for all the students)

**UPC:**

http://www.euroaquae.org/ (private login, available for all the students)

### III.2 Examinations

Acquired knowledge, understanding and subject-specific skills are tested by means of University examinations in the form of written papers and oral discussion for most of the modules.

**Written examinations**

The written examinations normally take place at the end of the semester in which the module is taught, i.e. in January, after Semesters I and III or May / June after semester II. Examination timetables will be communicated or published at the end of the semesters, and it is the student's responsibility to consult these, and to appear at the correct time and place for the examinations. If
you believe you might miss an examination or actually do so for any reason, such as illness, you must contact your Personal Tutor or Degree Programme Director as soon as possible.

All students have the opportunity to retake failed modules. Re-assessment will be allowed for modules examined in Semesters I and II. In such cases, the conditions will be specified as appropriate by the relevant institution and may include:

- (a) oral examination
- (b) re-taking a written examination at the next scheduled opportunity at the relevant institution
- (c) re-taking a written examination at the next scheduled opportunity under supervision of an employer (for candidates carrying out professional practice or research thesis not at the relevant institution)

If you are to be reassessed in any modules, you should be aware that you will need to make yourself available at this time. You should not be planning to leave your host institution before you have sufficient information about re-assessment.

Exam Revision. Exams are set to measure how well you have understood a subject. To have the best chance of passing, your knowledge of the subject must be extensive and organised so that you can not just repeat what you have learnt, but apply it to a variety of problems, perhaps in a new context of from a different perspective. **Remember - fail to prepare, prepare to fail!**

Use the syllabus and lecture notes to guide you as to the content of the exam. Do not 'spot' questions - assume anything that has been taught may be examined. Go over past exam papers, tutorial sheets and worked examples. Note that course content may change from year to year, and that some past exam papers may contain questions related to things no longer taught, or taught in the same way. You must understand the application of the concepts you learnt in the lectures if you wish to progress. Remember, you will develop knowledge and skills throughout the programme. If you have difficulty in understanding the concepts, contact the lecturer concerned, and they will try to help.

Before starting your revision it is useful to collate and update your notes and set a timetable. You acquired knowledge as you took notes. You developed an understanding of the subject through examples and reading. Exam revision is concerned with memorising and testing knowledge.

Everyone has their own way of revising which can include memory 'keys', spider diagrams and group revision. Practice developing outline solutions and essay plans from previous years’ exam questions.

Ensure that your revision timetable includes time off to relax and unwind, especially at the end of the day. Ensure that you pace yourself, to prevent being overtired and unwell.

Exam Technique. Arrive on time and come prepared with the equipment permitted (i.e. find out beforehand if programmable calculators are allowed, find out if an exam is open book) at least ten minutes before the exam. If there is a seat allocation, check it.

To obtain maximum marks from an exam it is important to answer the questions asked, and attempt the correct number of questions. You will be at a disadvantage if you spend too much time on one question and fail to complete the paper. It is often easier to get the initial marks on a new question than it is to raise an answer from an average to excellent one by continuing to work on the previous one.

Start by reading the exam instructions and paper. Decide which ones you will answer. Set a time for each answer and stick to it - you can always go back at the end if there is time to spare.

Always plan your answer, e.g. outline solution and essay plans. Remember, an examiner is looking for understanding - a 100% correct answer is a bonus. Try to answer the question in the order that it is asked, and make sure you read through the whole question before you begin answering.

When asked to write an essay - write an essay. Answer the question, cover all key points giving examples and using clearly labelled figures where necessary, and have an introduction, main section and conclusions. When asked to solve a problem make sure the solution is clear and your assumptions are highlighted.
**Oral examinations**

Oral exams for semesters I to III are organized as necessary in the different modules by the EuroAquae universities and according to the local rules and requirements.

For semester IV students will undertake one oral examination at the end. Students completing their semester IV will be required to present a poster or transparent and make an assessed oral presentation to the examination committee that may include the External Examiner as part of the oral examination. Students may be interviewed by the examination committee and External Examiner to assess the overall quality of the project undertaken. The date of these presentations will be communicated at least two weeks before the end of semester IV. All students should be available to attend.

**Failure to Attend**

Failure to attend an exam is a failure and is counted as an attempt! This means that you would have to resist the exam, the maximum mark that is awarded for reassessments is only the basic pass mark, and it may also affect the standard of the degree you graduate with. It is important that you report immediately to your Personal Tutor any problems that might affect any assessment and hence your academic progress. If you are ill, a medical note should be obtained from your doctor. Self certification is also possible for short absences in some cases. No consideration can be given to extenuating circumstances unless appropriate documentation has been submitted.

If for any reason you fail to attend lectures or assessments, or fail to perform satisfactorily, then you must discuss this with your Tutor, i.e. you must inform your Personal Tutor of any illness as soon as possible, whatever the effects of the illness, on your studies. Each case will then be individually evaluated by the Management Board.

**Success, Failure and Consequences**

The success for a student means that he/she obtains, after four semesters of the Course and after presentation of his/her MSc dissertation, the Joint MSc degree of five universities and the corresponding diploma. This is certified in an official graduation ceremony and two documents (that are issued following normal administrative delays): the diploma itself and the diploma supplement that supplies all curriculum results.

A failure is possible. In case of failure at examinations, not following compulsory activities, exclusion due to breech of disciplinary conduct (such as unethical behaviour, plagiarism, cheating at examinations, etc.) of the student, the studies will be terminated without achieving Degree status. The examination and re-sit rules of the host universities are always applicable and success or failure is formally decided at the end of year 1 or year 2.

The following procedure is applied:

I. During semester I, students must be conscious that they may have difficulties by carefully studying the prerequisites, by results of entrance or mock-exams, by comments and appraisals of teachers and, finally at the end of the semester, from the results of the examinations. In such cases concerned students must discuss problems with the teachers of semester I and take action accordingly by themselves in order to improve their knowledge and understanding.

II. The host university of semester I shall issue to the concerned students a first official warning (with copy to the Chairperson of the Examination Board) that they may fail because of their poor examination results. This warning shall be issued before the end of February. All students will be offered the possibility of reseating failed examinations once during semester II.

III. Similarly, for students who have succeeded in semester I examinations but show possibility of failure during the semester II, a warning from NU shall be issued by the end of May, with copy to the Chairperson of the Examination Board. All students will be offered the possibility of reseating failed examinations once before the end of semester II.

IV. At the end of semester II, the list of successful students and of the students who failed is drawn by the Examination Board and presented to the Coordinator for further action.
accordingly. To take ultimate decisions the Examination Board takes into consideration the results of all students for both semesters I and II, including the official warnings issued if any and the results of reseats. Newcastle University will issue to all students information on their results of semester II before the end of July. Upon receiving results, students who have non passing marks must understand that they may not be allowed to continue for the semester III. Final decision will depend upon local procedures and, ultimately, upon the Examination Board. The decision may not be known before the deadlines defined by European Universities normal procedures. The students that fail 1st year will receive a Certificate of Attendance for the semesters I and II by the coordinating institution.

V. After the end of the 3rd Semester, if any problem or failure occurs, the host-university will inform the Chairperson of the Examination Board.

VI. The Academic Tutor of the semester IV will inform the Chairperson of the Examination Board about the fulfilment of all requirements at the end of August.

VII. The Examination Board will take into account the results of both the Semesters III and IV and draw up accordingly the list of students who shall receive the Joint MSc Degree and those who failed. The latter may receive a certificate. The list will be signed by two members of the Examination Board and sent to the Coordinator.

VIII. Appeal & complaints. Appeals shall normally be made to and considered by procedures established by the Examination Board. With the agreement of all member institutions, however, the appeal may be made to the member institution providing a particular module. A student wishing to complain about a specific service or facility provided by a specific member institution shall invoke the complaints procedure of that institution. A student wishing to complain about any general aspect of the programme shall invoke the complaints procedure of the co-ordinating institution.

III.3 MSc thesis and portfolio of activities

The individual final project forms an important part of the EuroAquae degree. Individual projects are undertaken by second year students during semester IV. The project should be organised as follows:

I. All students, those who follow professional practice as well as those who follow preparation for research are to maintain close links, during whole semester IV, with their host institution. Formally this is materialised by producing after one month the Inception Report for the Coordinator of EuroAquae, preparing MSc thesis, filling up Quality Assurance questionnaires and assisting at graduation ceremony.

II. For students who have chosen to undertake professional practice a portfolio of activities undertaken has to be created. The content, the format and the presentation of the portfolio have to be agreed between the student, the supervisor (Academic Tutor) from the host institution (UNS) and the Institutional Tutor from the selected external company or public service. Each student must recognise that the preparation of the portfolio are his / her own responsibility. Advice and encouragement will be forthcoming from the Academic Tutor and Institutional Tutor but to a large extent portfolios are a test of how well students are able to organise their work and themselves. A successful portfolio necessitates a significant degree of motivation, initiative and self-discipline. A portfolio presents a description of the work done in the project and an in-depth review of at least one associated topic and details of the lesson learned.

III. For students who have chosen to undertake a research project, a final project report has to be created. A good project will allow the student to prepare a report that contains:

- clearly defined aims and objectives that should be stated at the outset of the project;
- a literature survey which examines critically any previously published work;
- details of a specific investigation, which may take the form of laboratory tests, field surveys, a mathematical analysis, an extended critical survey of source material or other practical application of theory and knowledge;
- discussion of the results and a logical argument which should lead to clearly stated conclusions;
- proper, accurate and consistent referencing within the text and reference list.

The precise requirements for your own project should be discussed with your supervisor.

**Each student must recognise that the project and the preparation of the report are his / her own responsibility.** Advice and encouragement will be forthcoming from the supervisor but to a large extent projects are a test of how well students are able to organise their work and themselves. A successful project necessitates a significant degree of motivation, initiative and self-discipline.

**MSc thesis**

The Academic Tutors will help to define the thesis content and its requirements and objectives through discussion with the student during the fourth semester. From then on the role of the Academic Tutor is to advise, to encourage and to assist in overcoming major problems. The Academic Tutor may assist in the development of a good writing style, but it is not their responsibility to proof read and correct grammatical and spelling mistakes, so make sure you always use tools like spellchecker before submission. The development of a good working relationship between Academic Tutor and student is essential to the production of a good thesis. How frequently the two should meet will be decided mutually, the preferred form of communication (other than meetings) is via e-mail. Make sure you are aware of your Academic tutor’s e-mail address and inform him/her of yours.

**CD/DVD Version of Report**

All students must submit a digital version of their report on CD/DVD, and also upload their report to the EuroAquae server, from which the report will be checked for plagiarism using the JISC system, which enables staff to identify the original source of any material included within student work by searching a database of several billion pages of reference material gathered from professional publications, student essay websites and other student works. For more information on this matter see:

[http://www.ncl.ac.uk/spo/jisc.html](http://www.ncl.ac.uk/spo/jisc.html).

Further information on plagiarism can be found in the Standards of Academic Conduct section later in this handbook.

**III.4 Marking Criteria**

**Examination of Students**

Assessment is regulated by Boards of Examiners at each Institution, reporting to the Examination Board for overall assimilation and decisions on progression. Marks of each module are weighted according to the module ECTS credit value.

The range of marks according to the ECTS grading scheme is:

- Excellent (A–0)
- Very good (B–1)
- Good (C–2)
- Satisfactory (D–3)
- Sufficient (E–4)
- Fail (FX–5 / F–5)

Partner universities agree to mark according to the above common marking scheme. The marks from all modules will normally be E-4 or better for successful completion. Exceptionally, compensation will be allowed by discretion of the Curriculum and Management Board for modules with grade FX. One re-sit examination shall be permitted per module.
Categories of marks

More detailed descriptors for each of these categories of marks will be developed to ensure consistency of marking. Member institutions may need to map these categories of marks to their own marking scales.

<table>
<thead>
<tr>
<th>ECTS Class</th>
<th>UNS</th>
<th>BME</th>
<th>UPC</th>
<th>BTUC</th>
<th>NU</th>
<th>Brief Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A – 0</td>
<td>18-20</td>
<td>5</td>
<td>0</td>
<td>≤1.5</td>
<td>90-100</td>
<td>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.</td>
</tr>
<tr>
<td>B – 1</td>
<td>≥16</td>
<td>4</td>
<td>1</td>
<td>≤2.0</td>
<td>70-79</td>
<td>Overall excellent. Thorough understanding of the topic. May contain minor errors. Extremely well presented and structured work.</td>
</tr>
<tr>
<td>C – 2</td>
<td>≥14</td>
<td>3</td>
<td>2</td>
<td>≤2.5</td>
<td>65-69</td>
<td>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.</td>
</tr>
<tr>
<td>D – 3</td>
<td>≥12</td>
<td>2</td>
<td>3</td>
<td>≤3.5</td>
<td>55-59</td>
<td>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.</td>
</tr>
<tr>
<td>E – 4</td>
<td>≥10</td>
<td>1</td>
<td>4</td>
<td>≤4.0</td>
<td>50-54</td>
<td>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.</td>
</tr>
<tr>
<td>FX – 5</td>
<td>≥8</td>
<td>0</td>
<td>5</td>
<td>Fail</td>
<td>45-49</td>
<td>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.</td>
</tr>
<tr>
<td>F – 5</td>
<td>&lt;8</td>
<td></td>
<td></td>
<td>Fail</td>
<td>26-39</td>
<td>Fail. Generally irrelevant approach and failure to understand basic requirements. Significant errors. Little or no structure and poorly presented. Fail. Limited work showing an inability to deal with the requirements. Some factually relevant material. Fail. Extremely limited work with very little factually relevant material. Fail. Little or no attempt to complete the work.</td>
</tr>
</tbody>
</table>
**Additional Assessment Criteria**

**Newcastle University**

An **External Examiner**, a distinguished member of the subject community, can be appointed by the Faculty Teaching and Learning Committee, after recommendation from the Management and Curriculum Board. The External Examiner is expected to:

- see and approve examination papers as appropriate;
- moderate examination and coursework marking as appropriate;
- attend Board of Examiners meetings;
- report to the University on the standards of the programme.

**Reporting and safekeeping of Marks**

The official full student record, including records of qualifications on admission and credits obtained and transferred from one member institution to another and contributing to the award of the degree, will be maintained by the EuroAquae coordinator.

Each member institution recognises the ECTS credit achieved by students studying at other institutions in the consortium.

For each student a record of academic progress and achievement in particular modules will be maintained by the member institution providing that module.

Marks for individual students’ modules undertaken at member institutions will be recorded in appropriate national statistical returns by that institution, in accordance with the national requirements and procedures for those returns.

Both the co-ordinating institution and member institutions, as appropriate, will retain the appropriate records for a minimum of seven years in accordance with best practice.

It is policy of the EuroAquae Consortium that the marks awarded for each module shall be disclosed to the student. Each student will, upon successful completion of this course be issued a Diploma Supplement (according to the Bologna process).

The Diploma Supplement is designed to provide a description of the nature, level, context, content and status of the studies that were pursued and successfully completed by the participant including the quality of work done by the student. The template developed by the Joint European commission - Council of Europe – UNESCO will be used. The Diploma Supplement (DS) is provided by the consortium acting as representative of all the partner institutions involved in the curriculum.

The format of the Diploma Supplement is reported in Appendix I.
I. ATTENDANCE, CONDUCT AND DISCIPLINE

You are required to attend timetabled formal periods of study and to visit your Tutor when requested. You have made a commitment to attend all relevant lectures, tutorials, laboratories, field trips and any other organised events relating to the Degree Programme. These are known as contact hours. Registers of attendance are kept for some practical, laboratories and field trips where safety reasons are involved. Registers can be taken at lectures and persistent absence is noted and may be taken into consideration in assessing your performance. You may be asked to meet your Tutor if you fail to attend formal contact hours. This is for your benefit, since it allows any problems to be discussed and help to be given where necessary.

Experience has shown that students who regularly fail to attend lectures tend to fail the exams.

The contact hours are set in order to teach you. Lecturers use them to pass on information, discuss topics and monitor your progress. They are an important part of the learning process. Tutorials, practical and field exercises are often done in groups. If a student is absent then it places an unfair burden on the other students in their group. If for any reason you are unable to attend an exercise, please advice the lecturer concerned, and they will make arrangements for you to attend on another occasion if it is possible.

If for any reason you are unable to attend lectures for an extended period of time or have to leave the host institution for a few days you must inform your Tutor, since the absence could affect your studies.

All partner universities requires all students to maintain high standards of academic conduct and, in particular, to avoid conduct amounting to cheating in examinations, the fabrication of research results or plagiarism. Cheating in examinations includes: copying from or conferring with other candidates; the possession or use of unauthorized material or equipment; and the impersonation of an examination candidate. Candidates, who knowingly permit themselves to be impersonated, or their work to be copied, will be regarded as cheating. Any student suspected of having cheated in examinations will be dealt with by the Examination Board and under the host University’s Assessment Irregularities Procedure approved by Council of the host institution.

II. ESSENTIAL EQUIPMENT

II.1 Calculator

A calculator is required. Many suitable makes and models are available BUT you must check which models on each University's approved list are permitted for use in an examination if such list exists. Currently, the only calculators on this list are:
the Casio FX82, Casio FX83, Casio FX85 and Casio FX115 (and variants thereof).

These are basic scientific calculators which are widely available at modest cost and all students should purchase one of these calculators as soon as possible. Other more versatile calculators with, for example, graphical capabilities may be useful and more convenient at other times during the course but there is no compulsion for students to purchase one of these more expensive calculators.

II.2 Stationery

To help keep systematic lecture notes and coursework, it is recommended that you should have your own stapler and hole punch and use A4 ring or lever-arch binders with separator cards. You are expected to provide your own writing paper for taking notes, etc.

II.3 DVD/CD-ROMs and USB

DVD/CD-ROM and USB storage facilities are needed to store information and students’ work where appropriate. DVD/CD-ROMs can also be useful to submit work to lecturers as necessary. You may purchase DVD/CD-ROMs at a subsidised rate at some host institutions.

II.4 Textbooks and Working Papers

Module Leaders will advise students on exactly what textbooks and working papers are required or advised. Textbooks are generally available from the main bookshops in the location where you are spending the Semester. Students should take advantage from the possibility of buying textbooks in different countries, especially as some specialised literature might not be available elsewhere or be more expensive.

II.5 Past Exam Papers

Past exam papers from the previous two or three years are generally available on each module. Past papers will be suggested and made available as appropriate.

III. PLAGIARISM AND ELECTRONIC ABUSE

It is very important that you read and fully understand these guidelines. If you do not, you risk jeopardising your course work marks and quite possibly your whole MSc.

We appreciate that not everyone is good at examinations, and they are particularly difficult for those whose first language is not English. It is hence essential that each student adopts the correct approach to his/her studies. You must ensure that the work you submit is your own (UNLESS you are told it is a group task and NOT assessed individually). When you submit coursework, dissertations, and theses, you are required to sign a very serious statement relating to the authorship of your work. This is not just some routine bit of bureaucracy, so you must treat it with the solemn respect it requires.

It is your duty to understand what plagiarism is, to be aware of the potential damage it may do to your career, and thus avoid it, and any suspicion of it, at all costs. You must take professional responsibility for what you write and for protecting your personal scientific integrity.

III.1 What is plagiarism?

Plagiarism is a type of fraud, where a person attempts to pass off the work of others as their own (and thus gaining personal credit for themselves by deceit). It is totally unacceptable if done with deliberate intent, and you are individually responsible for ensuring that you do not do it accidentally. Plagiarism typically involves copying the work of others and then failing to properly, clearly, and unambiguously acknowledge the true source of these facts, data, text, images, concepts or ideas. Another type of plagiarism would involve submission of the same work for formal assessment more than once, for different qualifications or degrees (at one or more institutions), even if all the work was by the same person. Plagiarism is not just very lazy, but one of the worse academic crimes possible – as bad as the complete fabrication or false reporting of
results. It is cheating and dishonest and you would not want, and cannot afford, either word to feature in your student record or in references written about you.

III.2 How to avoid suspicion of plagiarism?

1. Always put your name on your written work (e.g. in the footer or header of the document).

2. In your written work, **always properly acknowledge any use of published or unpublished work of others**, wherever you have used it. As science graduates (who ought to have read many published papers), you should already appreciate how this is done, via both observation of literature and personal practice.

3. **Follow the guidelines provided on citation and quotation** (see later).

4. **NEVER cut and paste sections of text into your final submitted coursework from other sources**, whether websites, electronic journal PDF files, published CD-ROMS, scans, lecture notes, or other student's work. There are no degrees of acceptability when it comes to this issue. **If ANY such activity is identified** (whether a source is acknowledged or not), your will get NO marks for that item of coursework, and you may face disciplinary procedures. You may of course collect and compile such extracts as part of your personal preliminary preparation work, but you MUST then examine all the information you have obtained, analyse and order it, and then in your submitted work present logically in your own words only those pertinent facts, observations or ideas that relate specifically to the coursework exercise that has been set. You may not be able to word things as well as established authors, but this skill will only come with practice, and you will get credit and benefit from trying. The analysing, rewording, and applying of information is the whole intellectual point of the exercise; it is because it takes effort, and more importantly, thought, that it contributes to the award of a degree. The simple act of compiling or copying material can be done by anyone, and does not establish your right to a degree.

5. It is very easy for staff to spot any cut and pasted material: often the font, spellings, writing styles, types of errors, and standard of English are distinct, and staff are often intimately familiar with the key sources that you are likely to use, and many other besides, including those on the internet. Typically, the copied source may not have been written with the same objective, so it is also often distinct because it is actually irrelevant to your exercise (and would thus gain you no marks anyway). In addition, any repetition of manually or electronically copied or transcribed text between different students, even if changed superficially, also stands out very strongly to the experienced marker. Increasingly, there are also sophisticated electronic means for automatically scanning work and identifying plagiarism, and you may requested to also submit your coursework in electronic form (as well as hard copy) to facilitate such a process. The plagiarist's chances of being caught thus exceed the chances of their escaping detection. While a certain similarity may result from students using legitimately the same sources independently, it is extremely unlikely that this would result in exactly the same wording.

6. **Never loan your assessed work, either before of after you have personally submitted it**, to any other student on your course, or to anyone who is likely to take either the same course or module. You cannot be sure what they might do with your work, and if they indulge in plagiarism – with or without your knowledge, suspicion may also fall on you.

7. **You must accept personal responsibility for safeguarding your work and controlling access to it**. Never leave copies of written work (either finished or in progress) somewhere where they can be seen by others (i.e. do not leave hard copies on your desk or in the classroom; do not leave print-outs uncollected next to the printer; do not leave personal work files on shared open access computer drives; do not leave a PC unattended if you are logged on to it; when logging off from a PC, make sure that the process has completed successfully before leaving it (this may be tedious, but it sometimes stalls, leaving it logged on and all your personal files accessible); do not leave floppy discs, CD, or other media containing your coursework in a public place.

8. **If anybody asks you to help them with their work by borrowing or looking at your own written material (text, answers to problems, etc.), NEVER agree to do so.** If anyone attempts to pressure or coerce you into doing so in anyway, report this immediately to your tutor. Remember, if someone is having difficulties, cheating will only make things worse for
them and not better. If anybody offers you copies of coursework, even from previous years, refuse it. We of course encourage people to verbally discuss ideas with their fellow students (if they feel comfortable doing so), but this is totally different from sharing written work.

9. Should you feel that you cannot complete an assignment, or complete it by the given deadline, do NOT feel tempted to cheat by resorting to plagiarism! You must talk to the person who set the assignment, your tutor, and the course co-ordinator at your host institution, as soon as you can, to see what solution may be possible. If the worst comes to the worst, it is much better to fail an exercise honestly rather than risk the disgrace and stigma of being found guilty of plagiarism.

### III.3 Quotations

A quotation is any passage of text that repeats exactly (“verbatim”) the precise words used by someone else in a published or unpublished source or personal written communication (including lecture notes). Even if you make minor changes to the reproduced text, it may still be considered plagiarism. Individual quotations can be just short distinct phrases (as little as two or three words) and are rarely more than two sentences. Whenever you reproduce somebody else’s words exactly in a quotation (or even with a few words edited out), you must follow these rules:

I. No individual quotation should be more than two sentences, and usually much less.

II. There must be a very specific and evident reason why you did not use your own words (e.g. a standard definition, or something controversial or memorable about the quote). Always use quotations sparingly (as little as possible).

III. The quotation must be immediately followed by a proper citation in parentheses which includes the authors’ family name(s), the year, and the specific page number on which the text occurred, e.g. (Tyson, 1995, p.200), (Aplin & Larter, 2004, p.10), (Tyson et al., 1979, p.300). This must be within the same sentence as the quotation.

IV. Unless you are specifically given permission otherwise, NO item of assessed written work must comprise more than 3% quotations in total (i.e. no more than 3% of the total words, exclusive of reference lists, must be quotations).

V. If sections of text in your written work are proven to have been copied and reproduced from an un-credited source (electronic or otherwise), and regardless of whether manually retyped, “cut and pasted”, or scanned, OR if this material exceeds 3% of the words of your document (whether credited or not), you will be deemed to be guilty of plagiarism and NO marks will be awarded for that item of coursework. You may also then face disciplinary action and an appropriate note may be added to your student record.

### III.4 Other citations

Even when you have not copied or transcribed text verbatim as an actual quotation, whenever you utilise the ideas, conclusions, data, examples, or facts of others in your written work, you must cite a reference to the source(s) within the sentence in which it appears (the family name of author, followed by year, but no page number is required in this case). The reader must be left in no doubt as to which are your own observations, data and ideas, and which have been borrowed from other sources. If you do not cite a source, you are in effect claiming that what has been written is your own work and ideas, and this is how it will be interpreted and judged. Note that it is not generally acceptable to just cite a single source at the end of a whole paragraph, as the reader may be unable to tell what part of the paragraph it relates to. If used, internet sources must also be cited (if you cannot find an author, cite the organisation and the year in the text, then give the full URL in your reference list). The same goes for DVD/CD-ROM and other electronic resources.

**Some web resources on plagiarism**

[http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml](http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml)

[http://owl.english.purdue.edu/handouts/research/r_plagiar.html](http://owl.english.purdue.edu/handouts/research/r_plagiar.html)
Guidance on plagiarism is provided by each partner institution and it is the student’s responsibility to make themselves familiar with the different regulations.

IV. COMMUNICATION AND STUDENT FEEDBACK

It is ESSENTIAL that you check your post and email on a daily basis, and respond immediately to any requests for meetings with staff or for return of information. You should also check the notice boards at your host institution regularly for information on classes, visits, coursework details, job opportunities, or social events.

You are always welcome to make constructive comments and observations on any aspect of the running of the course. Much of this can be done via your academic supervisors, course coordinators, and tutor. However, there are a number of specific ways in which we take your opinions and views into consideration by more formal means. Some of these allow you to raise your concerns anonymously, or as a group, if you prefer.

The initial point of contact for a student is with a lecturer or module leader for academic issues, or their local tutor for more generic issues. Thereafter the local Programme Director may be consulted.

We do encourage you to use all the means of expressing your views, through scheduled discussions with staff and email letters to supervisors and tutors, to the more formal procedures of Staff Student Committees, Boards of Studies, Focus Groups and completion of Feedback Questionnaires. We cannot help you if you don’t take advantage of the procedures we have installed!

IV.1 Questionnaires

You are able to comment on the quality of the Master Course and of the individual modules you take through direct contact with the lecturers, through the staff student communication procedures at each host university and anonymously by completing a student feedback questionnaire where applicable. Questionnaires are a means by the universities to ensure that standards of delivery are maintained. You will be asked to complete questionnaires throughout your programme. Please consider your answers carefully and respond truthfully. However, if you have any issues of major concern you should also discuss them with the Degree Programme Director at your host institution at the earliest opportunity.

IV.2 Quality Assurance Questionnaires

Evaluation questionnaires are also issued by the Independent Experts of the Master Course at the end of each Semester as part of the quality assurance procedures for EuroAquae. Data from your questionnaires are summarised by the Independent Experts and presented at the earliest Management Board meeting. If any problems are identified, the Management and Curriculum Board will discuss them and recommend an appropriate course of action in order to remedy the situation. Students representatives will highlight any points you might wish the Board to consider, and will inform you of the outcomes of these discussions.

Quality Assurance actions and procedures are described in the Terms of Reference for Independent Experts tasks annexed as Appendix II. The Handbook of Quality Assurance is available on the Course Website.

http://www.euroaquae.org

Note that Independent Experts for Quality Assurance produce twice a year a Report in which one can find the summarized results of the above mentioned questionnaires, as well as conclusions and recommendations. These Reports are available on the Website of EuroAquae Course.
IV.3 Complaints and Appeals

There are a number of procedures that should be followed if at any time you are concerned either with some aspect of life which is affecting your studies or with the Master Degree Programme. Many of these problems can be sorted out by your module leaders, your tutor or the course co-ordinator at each location. However, if it is necessary to pursue the matter further, then you must follow the host University procedures.

Please see Newcastle University web site at http://www.ncl.ac.uk/regulations/ for details.

On occasion, students may feel the need to make an academic appeal against a decision taken by staff in the School, particularly at The Board of Examiners. Appeals can only be made on the following grounds:

I. The examiners were not aware of circumstances affecting the appellant's performance. (Please note: if this ground is relied upon, the appellant must state the reason for not making the circumstances known in time for the original examiners' meeting, in accordance with the annual notice to candidates issued by the Academic Registrar's Office.)

II. Procedural irregularity on the part of the examiners.

III. Inadequate assessment by an examiner or examiners.

IV. Bias or prejudice on the part of an examiner or examiners.

Challenges to the academic judgement of the examiners on an assessment outcome or the level of award recommended cannot form the basis of an appeal. Claims made by the appellant should be supported by documentary evidence where appropriate.

Full details of the Appeals procedure can be found on the University web site at http://www.ncl.ac.uk/spo/appeals.html.
APPENDICES

I  DIPLOMA SUPPLEMENT AND DIPLOMA ATTESTATION

II  TERMS OF REFERENCE FOR THE QUALITY ASSURANCE TASKS OF THE INDEPENDENT EXPERTS

III  MODULES DESCRIPTION

IV  ACQUIRED SKILLS AND COMPETENCIES

V  CLUB OF FRIENDS: LIST OF MEMBERS

VI  GENERAL CALENDAR OF A CURRENT ACADEMIC YEAR

VII  ABBREVIATIONS AND ACRONYMS
APPENDIX I

DIPLOMA SUPPLEMENT
AND DIPLOMA ATTESTATION
Master of Science
Euro Hydro-Informatics and Water Management
EUROAQUAE

Joint Master Degree
Université de Nice – Sophia Antipolis / UNSA
University of Nice – Sophia Antipolis (France)
Brandenburgische Technische Universität Cottbus, Cottbus / BTUC
Brandenburg University of Technology, Cottbus (Germany)
Budapesti Műszaki És Gazdaságtudományi Egyetem / BME
Budapest University of Technology and Economics (Hungary)
Universitat Politècnica de Catalunya / UPC
Technical University of Catalonia (Spain)
Newcastle University / NU
University of Newcastle (United Kingdom)

Diploma Supplement
Personal Curriculum
Contents

Graduate:
Academic years: 200.-200.
# MASTER OF SCIENCE EURO-AQUAE
## DIPLOMA SUPPLEMENT
### PERSONAL CURRICULUM

**Graduate:**

**Date of birth:**

**Nationality:**

**Student identification number or code:**

**Academic Years:**

Diploma: Joint degree / Master of Science “Euro Hydro-Informatics and Water Management - EURO-AQUAE”

Coordinator: Professor Philippe GOURBESVILLE, University of Nice – Sophia Antipolis (France)

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### SEMESTER 1: Academic year

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<th>Institution</th>
<th>Descriptive title</th>
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### SEMESTER 3: Academic year

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Professional practice or Research project
Title: Institution or Company
Town, Country
Supervising University
Academic tutor
Professional supervisor

### CERTIFICATION OF THE SUPPLEMENT

Date:
Signature: Professor Philippe COURBESVILLE
Capacity: Coordinator of Euro-Aquae Master of Science
Official stamp or seal:
MASTER OF SCIENCE EURO-AQUAE
DIPLOMA SUPPLEMENT
Contents

OUTLINE STRUCTURE FOR THE DIPLOMA SUPPLEMENT
This Diploma Supplement model has been adapted from the model elaborated by the European Commission, Council of Europe and UNESCO/CAPES. The purpose of the supplement is to provide sufficient independent data to improve the international 'transparency' and fair academic and professional recognition of qualifications (diplomas, degrees, certificates etc.). It is designed to provide a description of the nature, level, context, content and status of the studies that were pursued and successfully completed by the individual named on the original qualification to which this supplement is appended. It should be free from any value judgements, equivalence statements or suggestions about recognition. Information in all eight sections should be provided. Where information is not provided, an explanation should give the reason why.

1. INFORMATION IDENTIFYING THE HOLDER OF THE QUALIFICATION
1.1. Family name(s):
1.2. Given name(s):
1.3. Date of birth (day/month/year):
1.4. Student identification number or code (if available):

2. INFORMATION IDENTIFYING THE QUALIFICATION
2.1. Name of qualification and (if applicable) title conferred (in original language):
Joint Master of Science: Euro Hydro-Informatics and Water Management (EURO-AQUAE).
The formal status of the award is that of a Joint Degree, a single degree awarded jointly by the partner institutions members of the Euro-Aqua Consortium. The degree certificate is issued to individual students by the University of Nice – Sophia Antipolis (France) acting as coordinating institution on behalf of the five public institutions.

2.2. Main field(s) of study for the qualification: Hydroinformatics and Water Management

2.3. Name and status of awarding joint institutions:
The five following universities compose the “Euro-Aqua Consortium” which awards jointly the Master of Science:
- University of Nice – Sophia Antipolis (France) / Université de Nice – Sophia Antipolis (France) coordinator,
- Brandenburg University of Technology, Cottbus (Germany) / Brandenburgische Technische Universität Cottbus, Cottbus (Germany),
- Budapest University of Technology and Economics (Hungary) / Budapesti Műszaki és Gazdaságtudományi Egyetem (Hungary),
- Technical University of Catalonia (Spain) / Universitat Politècnica de Catalunya (Spain),
- University of Newcastle (United Kingdom).
The 5 institutions administer the studies according to their respective national rules.

2.4. Language of instruction/examination: English
3. INFORMATION ON THE LEVEL OF THE QUALIFICATION

3.1. Level of acquired qualification: Master's degree (5 years of higher education studies equivalent to 300 ECTS)

3.2. Total length of the studies to obtain the MSc Euro-Aquae joint degree: 4 semesters (2 years – 120 ECTS)

3.3. Access requirements: Relevant Bachelor degree or equivalent (BS or Engineering) in Environmental Sciences, Physics, Computer Sciences, Geography, Geology, Chemistry and/or similar specialities. Advanced level in Mathematics is required. Minimum scores in English: TOEFL (575), IELTS (6.5), or equivalent. Basic knowledge of one of the other languages used by the consortium has to be acquired during the 2 year programme.

4. INFORMATION ON THE CONTENTS

Table of the curriculum for Euro-Aquae studies:

<table>
<thead>
<tr>
<th>SEMESTER 1</th>
<th>SEMESTER 2</th>
<th>SEMESTER 3</th>
<th>SEMESTER 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

4.1. Mode of study

Full time lectures, intensive courses, field trips, engineering projects with reports, web based collaborative engineering, professional/research practice, Master thesis.

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 attend at least 36 ECTS of the curricula in a different institution from their "European home institution".

An academic supervisor is appointed for each student (and an industrial supervisor during the professional practice) to assist and advice him/her during the 2 year program. During the research work or professional practice all students have to discuss their topic with an academic tutor and a professional tutor to validate the methodology and contacts.

4.2. Programme requirements: Objectives

The concept of the master is defined to answer the challenge of the water management anywhere in the world and for all situations with the methodologies and the tools which are the only ones able to provide efficient and sustainable solutions. The master of Hydroinformatics and Water Management is an innovative approach to strengthen young researchers, professionals and practitioners competencies both in water management, water-environment engineering as well as in the exploitation of the potential of modern ICT.
The programme is organized in a pedagogic continuum to provide introduction and common knowledge/soft skills (semester 1 all locations), acquisition and the use of hydroinformatics concepts, methods and tools (semester 2 NU), thematic specialization: hydroinformatics systems, urban waters management, inland management, decision support systems (semester 3 all locations except NU) and for semester 4 (all locations), a research project or a professional practice.

**Semester 1** - The first semester is dedicated to provide participants with the basic knowledge to be able to attend the Hydroinformatics and Water Management courses. Participants acquire collaborative skills to strengthen the community of the master and also of professionals and practitioners.

**Semester 2** - The second semester is defined as a compulsory common platform on Hydroinformatics and based on a set of techniques and tools applied in different situations. The acquired competencies provide participants with the general capacities compulsory to develop and to enter a specialization in the following semester.

**Semester 3** – Specialization Urban Waters Management at University of Nice - Sophia Antipolis (France) - The specialization on urban waters develops specific capacities for analysis, design, modelling and management for all the aspects of water supply, waste water treatments and flash floods in urban areas.

**Semester 3** – Specialization Hydroinformatics Systems at Brandenburg University of Technology Cottbus (Germany) - The specialization on Hydroinformatics Systems provides competencies about application in ICT potential for understanding and developing innovative solutions for water management in the profession as well as in research.

**Semester 3** – Specialization Inland Waters Management at Budapest University of Technology and Economics (Hungary) - The specialization focused on inland waters management develops specific capacities for analysis, design, modelling and management for the main aspects for river basin management and planning, hydrometry design and management and integrated resources management.

**Semester 3** – Specialization Decision Support Systems at Technical University of Catalonia (Spain) - The specialization on DSS develops capacities and competencies for the conception of systems for risk analysis, flood forecasting and warning, real time control.

**Semester 3** – Common activities - The 3 modules allow participants to develop and to complete engineering, pre-professional, practical and scientific skills in a multicultural environment just before entering the final exercise and practice of the master course.

**Semester 4** – Professional practice and research – The professional practice is defined as the first professional experience within a company or a public service on a real specific on-going project. The research orientation allows participants to obtain a capacity in a specific scientific or technical field in relationship with the most significant issues on Hydroinformatics.

### 4.3. ECTS

Every MSc student takes modules to a total value of 120 ECTS credits over four semesters (2 years). Since mobility is a fundamental concept of the programme, students must follow at least 30% (36 ECTS) of the curricula in a different institution from their “European home institution” which is the course entry place.

### 4.4. Programme Curriculum, Structure, and Features

Euro-Aquae is part of the Erasmus Mundus programme, a cooperation and mobility programme in the field of higher education which promotes the European Higher Education all around the world. Erasmus Mundus supports European top-quality Master 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 Master Courses.

Euro-Aquae is a modular degree designed for flexible delivery at a number of institutions, allowing and encouraging mobility of students. The master’s programme spans 4 semesters, or 2 years, and has the following partners:

- University of Nice - Sophia Antipolis (UNSIA, France),
- Brandenburg University of Technology Cottbus (BTU, Germany),
- Budapest University of Technology and Economics (BME, Hungary),
- Technical University of Catalonia (UPC, Spain),
- University of Newcastle (NU, United Kingdom).

The consortium of these 5 universities issues a joint degree (MSc.) defined as Master of Sciences in Hydroinformatics & 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).
All students are required to discuss the schedule of their studies and the attached mobility with their academic tutor to ensure they follow an appropriate programme. All students are appointed an academic supervisor for any issues that may arise during the programme. For semester 4, a complementary industrial or research supervisor reinforces the tutelage.

The study programme is as defined below:
During semester 1 of year 1, candidates take a total of 30 ECTS credits constituted by the following compulsory modules to value 6 ECTS credits:

<table>
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<tr>
<th>Code</th>
<th>ECTS</th>
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<th>Comp/Opt</th>
<th>Institution</th>
<th>Descriptive title</th>
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and compulsory modules to the value of 24 ECTS credits at any one selected institution as following:

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During semester 2 of year 1, candidates should take 30 ECTS credits at NU:

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During semester 1 of year 2, candidates take 30 ECTS constituted by 1 compulsory module (6 ECTS), 1 among 2 optional modules (6 ECTS) and 18 ECTS at any one institution:

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</tbody>
</table>
### 5. ACQUIRED SKILLS AND COMPETENCIES

#### 5.1. Programme Intended Learning Outcomes

The programmes provide opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas. The typical student will have:

**Area A - Knowledge and understanding**

- A.1. A sound scientific understanding of key basic subject areas of mathematics, physics, hydrology, hydraulics, Information and Communication Technologies (ICT), and Geographic Information Systems (GIS);
- A.2. An advanced knowledge and understanding and critical awareness of specializations at the forefront of discipline in water management, software engineering and modelling, decision support systems, water and society;
- A.3. Quantitative training in mathematical methods, computational modelling and hydroinformatics techniques;
- A.4. Knowledge of specific examples of schemes for urban and rural water management.

**Area B - Subject-specific/practical skills**

- B.1. Ability to use ICT tools and hydroinformatics technologies;
- B.2. Ability to design components of the water infrastructure and schemes for management of the water environment;
- B.3. Practical testing of design ideas through computer simulation with technical analysis and critical evaluation of results;
- B.4. Ability to evaluate critically the application of engineering and environmental techniques dealing with complex issues such as industrial, legislative and commercial constraints;
- B.5. Planning, execution and reporting of a research project or project in practice;
- B.6. Ability to search for information and develop ideas further.

**Area C - Cognitive skills**

- C.1. Ability to select and apply appropriate mathematical methods for modelling and analyzing relevant problems;
- C.2. Use of scientific principles in the development of engineering and environmental solutions for practical problems in water environment and water infrastructure operation;
- C.3. Use of scientific principles in the modelling and analysis of water environment and of water infrastructure operation;
- C.4. 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 water environment and in water infrastructure operation.
C.5. Originality in the creation of new products or methodologies or research outputs through synthesis of ideas from a wide range of sources;

C.6. Ability to produce solutions for problems through the application of engineering and water environment knowledge and understanding.

Area D - Key (transferable) skills

D.1. Management, transformation and presentation of data in a variety of ways;
D.2. Use of methods based on scientific evidence in the solution of problems;
D.3. Use of initiative, creativity and innovation in problem solving;
D.4. Effective communication in English (including written, oral and poster media);
D.5. Use of generic ICT, GIS and programming skills;
D.6. Independent learning and wider time and resource management;
D.7. Collaborative approach to team working and project management.

5.2. Teaching and Learning, Methods and Strategies

A. Knowledge and understanding

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.
A.2 is achieved during the Hydroinformatics phase of Semester 2.
A.3 and A.4 are achieved during Semester 3 (Thematic specialization 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.3 and A.4 is partly by the above techniques and partly by field visits, research projects carried out with industrial partners, and professional practice.

B. Subject-specific/practical skills

Learning B.1 is principally through lectures and tutorials in Semester 1 and 2.

B.2 to B.4 are learnt in Semesters 2 and 3 during more intensive modules addressing specialist themes and hydroinformatics methods: these include more hands-on computer laboratories and design-based activities.

B.5 and B.6 are primarily developed and practiced in Semester 4 during the research project or professional practice.

C. Cognitive skills

Fundamental aspects of C.1 are developed in Semester 1 (Basic courses in mathematics/physics/hydraulics etc.).

Subsequently,

C.1 to C.6 are primarily acquired in Semesters 2 and 3 during the intensive modules addressing specialist themes and hydroinformatics methods which include more hands-on computer laboratories and design-based activities.

C.5 and C.6 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.

D. Key (transferable) skills

Outcomes D.1, D.2 and D.5 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 1, 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.
D.1 to D.7 are developed further and practiced in coursework assignments in Semesters 2 and 3. Subsequently, the principal development of transferable skills (D.4 and D.6 in particular) occurs through involvement in the research project or professional practice.

5.3. Assessment Strategy and Methods

A. Knowledge and understanding

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 master thesis.

B. Subject-specific/practical skills

B.1 and B.2 are explicitly assessed in Semester 2 and 3 modules. Other outcomes B.3 to B.6 are not explicitly assessed, but all are necessary for the successful completion of coursework and project requirements.

C. Cognitive skills

Closed-book examinations are used to assess intellectual abilities.

Assessed coursework provides further opportunities to demonstrate intellect and ability.

The master thesis provides final evidence of the levels attained.

D. Key (transferable) skills

Skills D.1 to D.5 are essential to complete examinations and assignments to a satisfactory standard.

Acquisition of D.4 is demonstrated during assessment of coursework and of the project.

D.5 is explicitly assessed in GIS and ICT modules in Semester 1.

Outcomes D.5 and D.6 are essential for satisfactory completion of the coursework and the project. Completion of the project also requires the command of outcomes D.1 to D.4.

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

6. Grading Scheme and, If Available, Grade Distribution Guidance

6.1. Examination of Students

Assessment is regulated by Boards of Examiners at each Institution, reporting to the Curriculum and Management Board for overall assimilation and decisions on progression.

Marks of each module are weighted according to the module ECTS credit value.

The range of marks according to the ECTS grading scheme is:

- Excellent (A–0)
- Very good (B–1)
- Good (C–2)
- Satisfactory (D–3)
- Sufficient (E–4)
- Fail (FX–5/F–5)

Partner universities agree to mark according to the above common marking scheme.

The marks from all modules will normally be E-4 or better for successful completion. Exceptionally, compensation will be allowed by discretion of the Curriculum and Management Board for modules with grade FX. One re-sit examination shall be permitted per module.

6.2. Categories of marks

More detailed descriptors for each of these categories of marks will be developed to ensure consistency of marking. Member institutions may need to map these categories of marks to their own marking scales.
<table>
<thead>
<tr>
<th>ECTS Class</th>
<th>UNSA</th>
<th>BME</th>
<th>UPC</th>
<th>BTUC</th>
<th>NU</th>
<th>Brief Description</th>
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</thead>
<tbody>
<tr>
<td>A – 0</td>
<td>18-20</td>
<td>5</td>
<td>0</td>
<td>≤1.5</td>
<td>90-100</td>
<td>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.</td>
</tr>
<tr>
<td>B – 1</td>
<td>≥16</td>
<td>4</td>
<td>1</td>
<td>≤2.0</td>
<td>70-79</td>
<td>Overall excellent. Thorough understanding of the topic. May contain minor errors. Extremely well presented and structured work.</td>
</tr>
<tr>
<td>C – 2</td>
<td>≥14</td>
<td>3</td>
<td>2</td>
<td>≤2.5</td>
<td>65-69</td>
<td>Shows thorough understanding of topic. Substantial detail, with evidence of further study. Very well presented and structured work.</td>
</tr>
<tr>
<td>D – 3</td>
<td>≥12</td>
<td>2</td>
<td>3</td>
<td>≤3.5</td>
<td>60-64</td>
<td>Work provides substantial information. May contain minor errors of understanding. Some evidence of additional study. Very well presented and structured work.</td>
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<tr>
<td>E – 4</td>
<td>≥10</td>
<td>1</td>
<td>4</td>
<td>≤4.0</td>
<td>50-54</td>
<td>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.</td>
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<tr>
<td>FX – 5</td>
<td>≥8</td>
<td>0</td>
<td>5</td>
<td>Fail</td>
<td>45-49</td>
<td>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.</td>
</tr>
<tr>
<td>F – 5</td>
<td>&lt;8</td>
<td></td>
<td></td>
<td>Fail</td>
<td>26-39</td>
<td>Very limited understanding of material. Significant omissions, errors of understanding and factual errors. Generally poorly presented and structured.</td>
</tr>
</tbody>
</table>

Demonstrates minimum acceptable understanding in some though not all areas. Many factual errors and omissions. Generally poorly presented and structured. |
| 16-25 | Fail. Limited work showing an inability to deal with the requirements. Some factually relevant material. |
| 6-15  | Fail. Extremely limited work with very little factually relevant material. |
| 0-5   | Fail. Little or no attempt to complete the work. |
### 6.3. Matrix of acquired skills and competences

<table>
<thead>
<tr>
<th>Code</th>
<th>Module titles</th>
<th>A Knowledge &amp; Understanding</th>
<th>B Practical Skills</th>
<th>C Cognitive Skills</th>
<th>D Transferable Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU-AQ-1,5,C</td>
<td>Web-based Collaborative Engineering</td>
<td>A1</td>
<td>B1, B2, B3, B4</td>
<td>C2, C3, C4</td>
<td>D3, D4, D5, D7</td>
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<tr>
<td>EU-AQ-1,6</td>
<td>English language</td>
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<td>UNSA-1, EU-AQ-1,7,8, BME1,1, UPC-101</td>
<td>Mathematics and Physics</td>
<td>A1</td>
<td>B1</td>
<td>D1, D2, D5</td>
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<tr>
<td>UNSA-2, EU-AQ-1,8, BME2,2, UPC-100, CIV-217</td>
<td>Hydrology and Water Resources</td>
<td>A1</td>
<td>B1</td>
<td>D1, D2, D5</td>
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<tr>
<td>UNSA-3, EU-AQ-1,9, BME1,1, UPC-108, CIV-217</td>
<td>Intro to Water and Aquatic Environment Management</td>
<td>A1</td>
<td>B1, C2</td>
<td>D1, D2, D5</td>
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<tr>
<td>UNSA-4, EU-AQ-1,10, BME1,4, UPC-1,1, BVL-1, BE, 0324</td>
<td>Computer Skills, Databases &amp; GIS-ICT: An intro to the fundamentals of GIS, Computation</td>
<td>A1</td>
<td>B1</td>
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<td>D3, D5</td>
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<td>CIV-248</td>
<td>Integrated River Basin Management</td>
<td>A2, A3, A4</td>
<td>B2, B3, B4</td>
<td>C2, C3, C4</td>
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<td>CIV-255</td>
<td>Hydroinformatics Systems Development</td>
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<td>B1, B2, B3, B4</td>
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<td>CIV-859</td>
<td>Computational Hydraulics</td>
<td>A2, A3</td>
<td>B1, B2, B3, B4</td>
<td>C2, C3, C4</td>
<td>D1, D5</td>
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<td>CIV-879</td>
<td>Catchments and River Modelling</td>
<td>A2, A3, A4</td>
<td>B2, B3, B4</td>
<td>C2, C3, C4</td>
<td>D1, D5</td>
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<tr>
<td>SIV-222</td>
<td>Database Applications for GIS</td>
<td>A2, A3</td>
<td>B1</td>
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<td>SIV-330</td>
<td>Introduction to programming in Java</td>
<td>A2, A3</td>
<td>B1</td>
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<tr>
<td>EU-AQ-2,3-2,4-E</td>
<td>Hydro Europe Working as Virtual Company/Praxis</td>
<td>A2, A3, A4</td>
<td>B1, B6</td>
<td>C6</td>
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<td>EU-AQ-2,3-2,4-Y</td>
<td>Research introduction</td>
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<td>Modelling Methods for Urban Waters</td>
<td>A2, A3, A4</td>
<td>B2, B3, B4</td>
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<td>Methods for Water Supply and Waste Water Treatment</td>
<td>A2, A3, A4</td>
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<td>C2, C3, C4</td>
<td>D1, D5</td>
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<tr>
<td>UNSA-3,3</td>
<td>Environmental and Legal Aspects of Water Industry &amp; Municipalities</td>
<td>A2, A3, A4</td>
<td>B2, B3, B4</td>
<td>C2, C3, C4</td>
<td>D1, D5</td>
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<tr>
<td>UNSA-3,4</td>
<td>Project Management and Communication</td>
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<tr>
<td>EU-AQ-3,3-3,4-C</td>
<td>Geometric Modelling and Presentation</td>
<td>A2, A3</td>
<td>B1, B2</td>
<td>C1, C4</td>
<td>D3, D5</td>
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<td>EU-AQ-3,3-3,4-Y</td>
<td>Monitoring, Data Acquisition and Documentation</td>
<td>A2, A3</td>
<td>B1, B3</td>
<td>C1, C4</td>
<td>D3, D5</td>
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<td>BME-2,1</td>
<td>Modelling Methods for Inland Surface Waters</td>
<td>A2, A3, A4</td>
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<td>C2, C3, C4</td>
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<td>River Basin Management and Planning</td>
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<td>UFG-301</td>
<td>Artificial Neural Networks in Decision Support Systems</td>
<td>A2, A3</td>
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<td>UFG-302</td>
<td>Flood Risk Concepts and Application in River Basin Management</td>
<td>A2, A3</td>
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<td>C2, C3, C4</td>
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<td>Flood Risk Analysis and Operation of Irrigation Canals, Rivers and Reservoirs</td>
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<td>Flood Risk Analysis and Operation of Irrigation Canals, Rivers and Reservoirs</td>
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<td>B1, B2, B3, B4</td>
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<td>Research and Development Project</td>
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<td>EU-AQ-4,3-5</td>
<td>Professional Practice</td>
<td>A2, A3, A4</td>
<td>B1, B6</td>
<td>C1, C6</td>
<td>D1, D7</td>
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</table>
6.4. Mutual recognition within the Consortium and Final Degree

Each partner of the Consortium formally recognises the modules contained within the programme and their credit weightings. The coordinator collects results from the partners and certifies to the Consortium the outcome of the assessments of each participant.

The Diploma Supplement presents the details of the participant's academic programme and academic achievement. The formal status of the award is that of Joint Degree, a single degree awarded jointly by the partner institutions. An attestation of intention to grant degree is delivered by the coordinating institution. The final degree certificate (parchment) is issued to individual students by the coordinating institution. The 5 institutions agree to their logos being attached to this single degree certificate.

7. INFORMATION ON THE FUNCTION OF THE QUALIFICATION

7.1. Professional status

The main objective of this Master is to prepare and train future scientists and engineers in charge of modelling and managing projects in hydro-technologies and environment. These professionals can be involved in engineering/consulting activities in private companies, and are able to assist decision-makers of local, regional, national and international public bodies. Their professional excellence is accompanied by understanding of social and economic requirements that techniques should serve.

7.2. Access to further study: The EuroAquae joint Master degree qualifies the students to apply for admission for doctoral PhD research programs.

8. PERSONAL CURRICULUM

Graduate:
Date of birth:
Nationality:
Student identification number or code:
Academic Years:
Diploma: Joint degree / Master of Science “Euro Hydro-Informatics and Water Management - EURO-AQUAE”
Coordinator: Professor Philippe GOURBESVILLE, University of Nice – Sophia Antipolis (France)

SEMESTER 1: Academic year

<table>
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<tr>
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<th>Comp / Opt</th>
<th>Institution</th>
<th>Description Title</th>
<th>ECTS Class</th>
<th>Marks</th>
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<tr>
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<td>1</td>
<td>C</td>
<td>NU</td>
<td>Intake to Water and Aquatic environment management</td>
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<td>C</td>
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SEMINAR 1 30 1 C  BASIC ACQUISITIONS
### SEMESTER 2: Academic year

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<td>EVR-999</td>
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<td>2</td>
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<td>NU</td>
<td>Hydraulics and Water Management</td>
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<td>EVR-999</td>
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<td>C</td>
<td>NU</td>
<td>Hydroinformatics and Water Management</td>
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<td>EVR-999</td>
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<td>2</td>
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<td>NU</td>
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<td>NU</td>
<td>Catchment and River Modelling</td>
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### SEMESTER 4: Academic year

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Professional practice or Research project
Title
Institution or Company
Town, Country
Supervising University
Academic tutor
Professional supervisor

9. CERTIFICATION OF THE SUPPLEMENT

9.1. Date:
9.2. Signature:
9.3. Capacity:
9.4. Official stamp or seal:
10. INFORMATION ON THE NATIONAL HIGHER EDUCATION SYSTEM

The institutions who intend to issue this Diploma Supplement are resolutely engaged in the objectives of the Bologna Declaration (19 June 1999):

"...We (European countries) engage in co-ordinating our policies to reach in the short term and in any case within the first decade of the third millennium, the following objectives, which we consider to be of primary relevance in order to establish the European area of higher education and to promote the European system of higher education world-wide:

- Adoption of a system of easily readable and comparable degrees, also through the implementation of the Diploma Supplement, in order to promote European citizens employability and the international competitiveness of the European higher education system.

- Adoption of a system essentially based on two main cycles, undergraduate and graduate. Access to the second cycle shall require successful completion of first cycle studies, lasting a minimum of three years. The degree awarded after the first cycle shall also be relevant to the European labour market as an appropriate level of qualification. The second cycle should lead to the master and/or doctorate degree as in many European countries.

- Establishment of a system of credits – such as in the ECTS system – as a proper means of promoting the most widespread student mobility. Credits could also be acquired in non-higher education contexts, including lifelong learning, provided they are recognised by receiving Universities concerned.

- Promotion of mobility by overcoming obstacles to the effective exercise of free movement with particular attention to:

  - for students, access to study and training opportunities and to related services

  - for teachers, researchers and administrative staff, recognition and valorisation of periods spent in a European context researching, teaching and training, without prejudicing their statutory rights.

- Promotion of European co-operation in quality assurance with a view to developing comparable criteria and methodologies. Promotion of the necessary European dimensions in higher education, particularly with regards to curricular development, interinstitutional co-operation, mobility schemes and integrated programmes of study, training and research"...
UNIVERSITÉ DE NICE-SOPHIA ANTIPOLIS
UNIVERSITY OF NICE-SOPHIA ANTIPOLIS

ATTESTATION DE REUSSITE AU DIPLOME
ATTESTATION OF COMPLETED DEGREE

Le Directeur de POLYTECH NICE-SOPHIA atteste que
The Director of POLYTECH NICE-SOPHIA attests that

le master SCIENCES, TECHNOLOGIES ET SANTE
dans le domaine SCIENCES, TECHNOLOGIES ET SANTE
Mention SCIENCES ET TECHNOLOGIES DE L’INFORMATION ET DE LA COMMUNICATION (STIC)
spécialité HYDRO-INFORMATIQUE ET GESTION DE L’EAU - EURO AQUAE
à finalité Professionnelle
Diplôme en partenariat international délivré conjointement par
Université de Nice – Sophia Antipolis (France)
Université de Newcastle (Royaume-Uni)
Université Polytécnica de Catalunya (Espagne)
Université de Technologie de Brandebourg Cottbus (Allemagne)
Université de Technologie et d’Economie de Budapest (Hongrie)

the Professional master degree SCIENCE, TECHNOLOGIES AND HEALTH
in the field SCIENCE, TECHNOLOGIES AND HEALTH
in the area SCIENCE AND TECHNOLOGIES OF INFORMATION AND COMMUNICATION (STIC)
with specialization in HYDRO-INFORMATICS AND WATER MANAGEMENT- EURO AQUAE
International Joint Master of Sciences delivered by
University of Nice – Sophia Antipolis (France)
University of Newcastle (United Kingdom)
Technical University of Catalonia (Spain)
Brandenburg University of Technology Cottbus (Germany)
Budapest University of Technology and Economics (Hungary)

a été décerné à
has been granted to

«Civilité » «Nom» «Prénom»
Né(e) le «date» à «lieu» («pays»)
born on the «date» in «lieu» («country»)

au titre de l’année universitaire 2007/2008
ce qui lui confère 120 crédits européens
with the award of 120 credits units
in the academic year 2007/2008

Fait à Nice, le «date mm/yy
Executed at Nice, «date mm/yy

GOURBESVILLE Philippe

N°étudiant / Student number : «numbers»

Avis important: Il ne peut être délivré qu’un seul exemplaire de cette attestation. Aucun duplicata ne sera fourni.
Important notice: this attestation is provided as a single original copy. No duplicate will be furnished.
APPENDIX II

TERMS OF REFERENCE FOR THE QUALITY ASSURANCE TASKS OF THE INDEPENDENT EXPERTS
**Preliminary Note**

Until the beginning of the Academic Year 2009-2010 the Quality Assurance procedures have been carried out accordingly to the “QA Handbook” that has been approved by the Management Board at the meeting held on 6-7 October 2006 in Budapest. The QA Handbook defines all tasks of the Management Boards, Stakeholders and Independent Experts related to the QA. It contains also the chronogram of these tasks during an Academic Year as well as blank forms of questionnaires. The QA Handbook and the blank forms are accessible under PDF format for authorised persons on the EuroAquae Web Site http://www.euroaquae.org/. The blank forms of questionnaires under MS WORD format can be downloaded from that site.

From the beginning of the year 2009-2010 a new procedure of polling has been implemented by the Project Coordinator and is carried out under the Coordinator's responsibility. The principle of the procedure has been approved by the Consortium Management Board meeting in October 2008 in Budapest. Accordingly to the procedure the stakeholders are asked to answer to on-line questionnaires directly on the EuroAquae website. The answers are then forwarded under the form of EXCEL files to IEs. In that way the IEs receive all answers grouped together and anonymous. The on-line questionnaires have been simplified as compared with those used until present Academic Year.

The Consortium Management Board meeting in October 2009 in Cottbus decided that new text of the Terms of reference for the IEs must be elaborated. The Board charged the IEs with preparation of the draft for new ToR and present the draft for discussion and approval during the Board meeting in March 2010 in Nice. Consequently the text of the ToR that follows in the sequel will be replaced in near future by new text approved by the Board.

**Terms of Reference as posted on the EuroAquae Website**

The Master Course is fully integrated to the European Credit Transfer System (ECTS) according to the Bologna process and the national rules of each institution. All modules, for all institutions, are associated to ECTS and evaluated with the "ABCDE grading scale".

For validation of coherency of the curriculum, improvement of content of the modules, coordination of the programme, standardisation of ICT support and mutual recognition within the consortium as well as for solving academic and administrative issues about students and teachers affairs the Management and Curriculum Board (MCB) is set up. On the MC Board, each university member of the consortium is represented by one member (designated as contact person for the project) or representative. The Board is complemented by two Independent Experts (IE) who are in charge of Quality Assurance (QA) and evaluation.

The modules of the master course fully enter the quality assurance process of each institution of the consortium. To obtain a global vision of the curricula, the quality assurance of the course is supervised by the MC Board. The specific task of Quality Assurance analysis is carried out annually and for each module by 2 Independent Experts (IE).

Quality Assurance activities are defined in details in Appendix II under the title “Terms of Reference for the Quality Assurance tasks of the Independent Experts. The IE proceed in their task essentially through analyses and synthesis of anonymous questionnaires filled up by all stakeholders (students, teachers, Third Country scholars, professional practice tutors). The IE use, in their analyses, information gathered during MC Board meetings as well as information obtained through interviews and discussions with the stakeholders, including the Alumni Association. The QA purpose is to make sure that the project activities follow correctly their definition and proceed according to the objectives of the Course.

Independent Experts prepare each year two QA Reports based on questionnaires and other information:

- an Interim QA Report, issued in March;
- a Final Annual Report, edited in September.
The QA Reports prepared by the IE and approved by the MC Board are parts of the outcomes of the Erasmus-Mundus project EuroAquae and are submitted by the Consortium Board to the Commission of the European Union.

Terms of Reference

1. These Terms of Reference (ToR) define the aims, design and implementation of the internal evaluation of EuroAquae Quality Assurance (QA) by the Independent Experts (IE). The ToR will be amended and adapted based on the needs and experiences. The Management & Curriculum Board (MCB) of EuroAquae will formally approve each new version.

2. The aims of the internal evaluation are the general quality assessment and the measurement of the degree of satisfaction by all stakeholders of EuroAquae. In particular, QA will be directed towards the evaluation of the quality of the programme of EuroAquae as “excellence” and the quality as the fulfillment of the “expectations” of the stakeholders.

Overall methodology of evaluation will be based on the effort to define for each considered item its desired outcomes and compare them with the outcomes actually reached. For the tasks being carried out but not finished yet provisional assessment based on available information will be done in order to introduce desired improvements, if any. Detailed approach for each item will be described in reports by IE.

3. The stakeholders of Euro-Aquae, for the purpose of this QA, are:
   • The Students (S)
   • The Teaching Staff (T)
   • The Contractors (the partner-universities) (C)
   • The End-Users (present and potential future employers of the students and other Academia) (E)

4. The design of the internal evaluation is based on a fourfold scheme:
   • SCHEME A: evaluation by the stakeholders S, T & C through a self-assessment procedure;
   • SCHEME B: evaluation by the IE of the published information about the programme;
   • SCHEME C: evaluation by the IE through formal questionnaires 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 IE through reporting based on their personal experience and on the external opinions collected from the Profession and Academia.

5. The implementation of the schemes listed under point 4 is as follows:

The IE submit to the MCB through the Co-ordinator of the Project an Interim Report in March and an Annual Report in September each year. IE can submit to the MCB through the Co-ordinator of the Project intermediate notes concerning QA at any time during the academic year.

   • SCHEME A: carried out in December/January, submission to the IE in February, who report to the MCB in March of each year;
   • SCHEME B: carried out in February with report to the MCB in March of each year;
   • SCHEME C: carried out in June, submitted to the IE in July, who prepare a synthesis report, including also the results of Schemes A and B, submitted to the MCB in September each year.
   • SCHEME D: IE will present to the MCB an Initial Note by December 2004. Then the activities of the scheme D will be reported systematically in Interimary and Annual Reports.

6. The annexes A/S, A/B, A/C, B, C/S, C/T and D of this document form an integral part of the ToR, to be adapted as needed.

   • SCHEME A: carried out in December/January, submission to the IE in February, who report to the MCB in March of each year;
   • SCHEME B: carried out in February with report to the MCB in March of each year;
• SCHEME C: carried out in June, submitted to the IE in July, who prepare a synthesis report, including also the results of Schemes A and B, submitted to the MB in September each year.

• SCHEME D: IE will present to the MCB an Initial Note by December 2004. Then the activities of the scheme D will be reported systematically in Interimary and Annual Reports.

APPENDIX III

MODULES DESCRIPTION
Semester 1 - Basic acquisitions – All partners of the consortium

Module 1.1 – Mathematics & Physics
The participants receive a refresher course on mathematics and physics used in water engineering and Hydroinformatics (numerical and computer methods). Mathematics covers statistics applied in hydrology (Cf. extreme values). Physics is focused on fluid mechanics.

Module 1.2 – Hydrology & Hydraulics
The module gives to the participants the basic principles of hydrology and free-surface hydraulics. The presentation covers concepts, methods and tools used in engineering activities. Subjects are hydrological cycle, precipitations measurement and analysis, evaporation analysis, rainfall-runoff analysis, physical properties of water, hydrostatics, basic hydrodynamics, uniform flow in channels and pipes, steady-state, non-uniform and unsteady flow concept.

Module 1.3 – Introduction to water and aquatic environment management
The module presents the water issues in the world, such as floods, draughts, sanitation, water supply, irrigation. Lectures are focused on the operational management of the aquatic environments and the key role of Hydroinformatics. The module covers ecological, physical, chemical and biological aspects of aquatic environments and the related artificial infrastructure/constructions.

Module 1.4 – Computer skills, databases and GIS - ICT
The module provides basic skills in operating computer resources in networks, in one programming language, in databases management and in Geographical Information Systems (GIS) Technology. The participants receive an introduction into modern ICT and the position of ICT in engineering activities related to the water field. Exercises are mainly focusing on simple programming examples and GIS application for water related problems.

Module 1.5 - Web-based collaborative engineering
The course introduces the use and practice of Web-services and software for collaborating engineering and communicating over the Internet. Participants from all places have to collaborate over the Net on a given engineering exercise within small mixed groups. The intention is to familiarise with the medium Internet and establish virtual contacts between the participants who will later meet in the 2nd semester face to face. Students are supposed to acquire skills of working in an heterogeneous multi-cultural environment. The module is technically coordinated by BTUC.

Module 1.6 – European Language I skills
The module is defined as integrated language training in one of the language used by the European institutions (French, German, Spanish and Hungarian) or in another European language but not in English which is the working language of the Master Course. The validation is obtained through the evaluation systems established in each hosting institution.

Semester 2 – Hydroinformatics - NU

Module 2.1 – Hydroinformatics & Integrated River Basin Management
The module presents the context of different environments such as urban areas, catchments, coastal zones. According to these specific situations, the course gives a methodology to identify the type of Hydroinformatics methods and tools. The course provides a global vision of computer based decision support systems that are widely used into offices of engineers, water authorities, national bodies and international agencies. The module underlines the major issues on sustainable water management, the water policies and strategies of management.

Module 2.2 - Numerical methods & computational hydraulics
The module provides introduction, through theory and practice, to numerical methods applied generally to the water field and especially to computational hydraulics. The course is based on introduction to differential equations in fluid mechanics for free-surface flow and transport system used for unsteady flows simulation. The module presents in details and through exercises the most widely used approaches such as method of characteristics, finite differences and finite elements.
Module 2.3 – Introduction to software packages & Modelling of Floods

The module offers to the participants to use and to apply through case studies the major modelling packages for hydrological catchments modelling, 1D and 2D free surface flows in continental and marine environments. The proposed tools are issued and developed by the most advanced professional and scientific producers such as Danish Hydraulic Institute (DK), Electricité de France EDF (F), Deltares (NL), Wallingford Software (UK), Halcrow (UK) DHI-WASY (DE). The purpose for the participants is to have an extensive knowledge and practice of the modelling procedures with the different packages for the modelling of floods.

Module 2.4 – Software engineering & Hydroinformatics Systems Development

The module presents the main concepts of software engineering based on modern ICT. Knowledge on programming and Web-technologies are complemented. Introduction is given to computational environments such as Internet, clusters, parallel computing etc. as well as the design, implementation and set-up of water related Web services.

Module 2.5 – Climate Change: vulnerability, impacts and adaptation

This module addresses the risks and likely impacts of climate change in the human, natural and built environments, covering key aspects such as water resources, flooding, sea level rise and coasts, health, transport, infrastructure and cities. Engineering strategies for adaptation are described in detail, so the participant can learn not just how climate change will impact society, but also how society can respond. Participants are well equipped to assess, propose and apply sustainable strategies in a range of key infrastructures and environmental settings.

Module 2.6 – European Language skills – English – Thesis writing

The module is focused on thesis writing (MSc thesis) in English and includes also a communication part (oral and written activities with multimedia devices and tools) focused on thesis defence. On completion of this module, the participant acquires essential skills which are compulsory into future professional activities and positions in multi-cultural environment.

NB: During Semester 2, each participant identifies and confirms a specialisation for Semester 3. Semesters 3 & 4 could be partly realized via a placement with one of the Third Country institutions (max 15 ECTS) and according to a pedagogic agreement.

Semester 3 – Thematic specialisation - Urban waters – UNS

Module 3.1 – Modelling methods for urban waters (sewage network, floods and waste waters)

The module is focused on the context and the nature of modelling in the urban environment. The participant acquires the exhaustive knowledge about hydroinformatics methods and tools (variety of modelling systems: physically based, data driven, lumped models) available to cover the urban problems such as sewage network definition, optimization and management, urban flooding or waste water management.

Module 3.2 – Methods for water supply and waste waters treatment

The module presents the main methodologies and techniques applied for the water supply and the waste waters treatments. The participants acquire theoretical knowledge about the different technical solutions. Through case studies and examples, they are trained to define and manage operational solutions in various situations. The course includes a wide use of optimization methods for technical and economic purposes as well.

Module 3.3 – Economical and legal environments – Water industry & municipalities

The module covers legal frameworks for the development and the protection of water resources and water services, the development of policies, laws and standard (Cf. European Water Framework Directive), the socio-economic system components with major concepts as subsidiary principle, deregulation, free market and competition of interest. The relationships and strategies between water industry and municipality are developed and analysed according to the rules of the water market. The module could also be taught as e-learning activity for all partners.
Module 3.4 – Project management & communication

The Project Management (PM) techniques as planning, task hierarchy, decision making and financial awareness are essential for the development of project in urban environment. The module is focused on the acquisition of the Project Management applied to generic projects as water supply, sewage network, waste water management and flood protection. The module includes the needs of communication related to such projects in relation with social, professional, economic and cultural urban environments.

Semester 3 – Thematic specialisation - Hydroinformatics Systems – BTUC

Module 3.1 – Numerical simulation: free-surface and groundwater modelling

Water resources depend on groundwater and free-surface flow. Description of free-surface and groundwater flow processes are given in terms of differential equations and common numerical schemes. Aspects of integration of small to large scale processes are discussed and principles for coupling of software for interacting processes presented.

Module 3.2 – Information and process modelling in hydro-engineering

Information modelling for Hydroinformatics systems in water related projects based on the object oriented modelling technique (incl. UML and implementation techniques) is introduced. Meta Data and information management strategies are presented. Basic mathematics of theory of sets and graphs are presented and applied for process modelling in projects. Examples are modelled taken from flood management and coastal engineering projects.

Module 3.3 – Geometric Modelling and Presentation Methods

Mathematical background for modelling geometry in the context of numerical grid generation and presentation of physics in Web environment are taught. Small examples are implemented and exercises with commercial software run. Attention is given to impact of discretisation to correct representation of physical processes.

Module 3.4 – Monitoring, data acquisition and documentation

Sustainable water resources management demands for monitoring by data acquisition in the field and laboratory as well as simulation by computer models. Concepts of monitoring and data acquisition are presented and mathematical concepts (tensor analysis, set theory) for handling mass data from field measurement and numerical simulation introduced. Implementation into Hydroinformatics Systems by object-oriented approaches to support information analysis, visualization, documentation and archiving are shown. Approaches are taught in the view of Web-based technology and coupling standard software tools by generalised information bases.

Semester 3 – Thematic specialisation - Inland waters management - BME

Module 3.1 – Modelling methods for inland surface waters (rivers with floodplains, lakes and reservoirs)

This module gives an overview on the problem oriented numerical modelling methods in surface waters, the applicability of which is presented by a number of case studies. Processes to model include flow, mixing, sediment transport and bed morphology, and the focus is on the multidimensional approach. Both grid-based models and Lagrangian particle tracking techniques are described. Model implementation in complex conditions such as main channel with forested floodplains, or lakes with vegetated littoral zones are also discussed. Planning and performing data acquisition for model calibration and verification, moreover, model simplifications vs. information loss are highlighted, too. An introduction to numerical solvers with capability of static adaptation to input data fields or dynamic adaptation e.g. to the modelled flow (including both space and time refinement or coarsening) give an impression on future developments. Selected river and lake case studies show the merits and utility of 2- and 3D methods in surface water hydro- and sediment dynamics projects.

Module 3.2 – Hydrological modelling and forecasting (rainfall-runoff, flood forecast, lake and wetland water balance)

The general purpose of this module is rainfall-runoff, channel flow and lake water balance modelling in system theory approach. Linear systems is discussed in details including rainfall-runoff input-output models, various methods for determining the unit hydrograph, linear kinematic
wave equation, various continuous and discrete cascade models, base-flow analysis, stochastic models and the Kalman-filtering. A brief introduction to non linear systems, including the implementation of non-linear processes in rainfall-runoff and channel flow models, effective rainfall and anticipant rainfall/infiltration is also given. Geomorphic-based watershed models with non-linear storage, as well as GIS and remote control serve as case studies in hydrological modelling.

Module – 3.3 River basin management and planning (under the EU Water Framework Directive)

This module first gives an introduction to river basin management and to the global understanding of integrated river basin management and planning. The focus is on the EU Water Framework Directive (WFD) and the relevant EU directives, moreover, on the R&D challenges of and EU guidance documents for its implementation. Further topics include the identification of the environmental, social and economic objectives for water management, planning of programmes of measures to achieve the objectives, integration of the river basin management plans under the WFD and under the policies of the economic sectors. An overview of the best practices of informatics, GIS and mathematical modelling for river basin management and planning is also given. Aspects such as participatory river basin management, the role and approaches for public participation and social learning are also dealt with. The module is completed by discussing the main principles of international river basin management and management of large river basins.

Module – 3.4 Advanced hydrometry and data analysis in surface waters (automated, various space-time resolution techniques)

In this module an overview is given on the up-to-date techniques and instrumentation to collect river and lake bathymetry, flow velocity, sediment transport and bed material data with various space and time resolution. Special attention is paid on automated techniques, optimising measurement sites and periods in order to maximise data information content. Methods and tools relevant to fluvial and lake conditions and scales (including e.g. the wind as external forcing factor) are described. The teaching material also contains computer analysis, evaluation and displaying methods as well as the ways to utilise the data in numerical model calibration and verification.

Semester 3 – Thematic specialisation - Decision Support Systems - UPC

Module 3.1 - Artificial neural network for Decision Support Systems (DSS)

In this module the basis and the technology associated to the use of neural networks is presented. The module is oriented to the definition of Decision Support Systems (DSS) in terms of the minimum set of variables used to take the appropriated decisions in terms of risk/vulnerability derived from real conditions in hydraulic systems: floods in river basins, urban areas or others.

Module 3.2 - Flood risk concepts and application in river basin management

This module is oriented to define the risk criteria and application to determine in real scenarios a risk map associated to a flood event predicted or estimated. The module focuses in the use of DTM information, hydraulic tools (numerical models in 1D and 2D), and the definition of risk database criteria than can be customized or adapted to any specific situation, and the use of decision support systems trained with the hydraulic tools presented before.

Module 3.3 - DSS for flood risk in urban areas

The specificity of this small basins where the floods goes through a street networks, with a collecting system constituted by a set of street inlets and the risk associated to the pedestrians and urban components (houses, urban infrastructures, cars, shops, etc) is addressed. In this module the topics are concentrated in the runoff and flow process in urban area along the streets, the hydraulic analysis of sewer systems and the global risk problem associated to these concepts.

Module 3.4 - Real time control and operation of irrigation canals, rivers and reservoirs

This module is oriented to the global management of the irrigation infrastructures. The key problem is to manage all the control gates along the canal, rivers and reservoirs in order to supply
the water volumes demanded by the farmers at the right instant and in the desired quantities. This can be done in terms of a real time control process, first defining the trajectories of the control gates according to the initially desired discharges, and finally in real time, in case of modifications/perturbations produced during the control process. Open Channel hydraulics, system dynamics and control theory are used in this module.

Semester 3 – Common activities

Module 3.5 – European Language II skills – All partners

The module is defined as an integrated language training in one additional European the language used by the European institutions (French, German, Spanish and Hungarian) or in another European language but not English or the language of the module 1.6 (1st semester). The validation is obtained through the evaluation systems established in each hosting institution.

Module 3.X – Hydro-Europe – Working as virtual company/institute – UNS

HydroEurope is an intensive course focused on collaborative engineering and based on the successfully experiences running since 2002 between the partners (Cl. www.hydroeurope.org). The main objective for the participants is to acquire and to validate collaboration and professional skills through a virtual environment. International teams composed with participants from each academic partners work collaboratively remotely through Internet on a case study where a variety of hydroinformatics tools can be applied and used. Study cases are commonly defined according to specializations. Field activities accompany this activity and final presentations take place at UNS at the end of semester III.

Module 3.Y optional – Pre professional training - UNS

This interdisciplinary module is dedicated to an intensive course focused on acquisition of professional skills as professional organizations, international structures and organizations, legal environment of companies, communication, ICT for engineering activities, written and oral presentation, reporting and synthesis. The module is offered to all partners of the consortium and concluded by an intensive course after HydroEurope.

Module 3.Y optional – Research methodology - BTUC

The interdisciplinary module is dedicated to an intensive course focused on acquiring research methodologies as well to specific topics in Hydroinformatics within Web-based seminars. The module presents how to approach research work, how to validate simulation models and how to document findings, presenting them and writing reports. Within seminars, the students present their current work from which master thesis are identified. The module is shared by all partners of the consortium and support coherence within the program by face-to-face meetings.

Semester 4 – Professional practice/professional internship & Research

Module 4.1 – Research & development project – 6 months – Coordination BTUC

The definition of the master work in the research area is made in dialogue between the student, a mentor from the host institution of semester IV - and possibly with an academic tutor from a third country - and an external partner of the water field (industrial, consulting company, public services...). The research project is carried out in the research environment of the consortium members. For the participants hosted by NU for semester 1, the institution for the module must be different from NU. The work is concluded by a thesis dissertation with defence involving at least representatives from 2 European institutions. The operational organization of this module is ensured by BTUC and with the full participation of all the consortium members. The validation of the module provides 30 ECTS.

Module 4.1 – Professional practice/professional internship – 6 months – Coordination UNS

The professional practice is carried out into a company or public service (external partner / associated partner), on a specific project defined in cooperation between the student, a mentor from the home institution, a supervisor from the host institution (UNS) and a mentor from the external partner (public service or private structure). The project carried out by the student takes part of the regular activities of the company or public service. This professional internship is considered for the student as a first professional experience as executive or project engineer in Hydroinformatics. The evaluation and the validation of the module are carried out mainly trough professional criteria. The work is concluded by a portfolio which presents a description of the
work done in the project and an in-depth review of at least one associated topic and details of the lessons learned. The professional practice is achieved in a European company or a European public service. The operational organization of this module is made by UNS and with the full participation of all the consortium members. The validation of the module provides 30 ECTS.
APPENDIX IV
ACQUIRED SKILLS AND COMPETENCIES
Acquired skills and competencies / Learning outcomes

Area A - Knowledge and understanding
A.1. A sound scientific understanding of key basic subject areas of mathematics, physics, hydrology, hydraulics, Information and Communication Technologies (ICT), and Geographic Information Systems (GIS);
A.2. An advanced knowledge and understanding and critical awareness of specializations at the forefront of discipline in water management, software engineering and modelling, decision support systems, water and society;
A.3. Quantitative training in mathematical methods, computational modelling and Hydroinformatics techniques;
A.4. Knowledge of specific examples of schemes for urban, rural, river and coastal water management.

Area B - Subject-specific/practical skills
B.1. Ability to use ICT tools and Hydroinformatics technologies;
B.2. Understanding of the process of design of the components of the water infrastructure and schemes for management of the water environment;
B.3. Practical testing of design ideas through computer simulation with technical analysis and critical evaluation of results;
B.4. Ability to evaluate critically the application of engineering and environmental techniques dealing with complex issues such as industrial, legislative and commercial constraints;
B.5. Planning, execution and reporting of a research project or project in practice;
B.6. Ability to search for information and develop ideas further.

Area C - Cognitive skills
C.1. Ability to select and apply appropriate mathematical methods for modelling and analyzing relevant problems;
C.2. Use of scientific principles in the development of engineering and environmental solutions for practical problems in water environment and water infrastructure operation;
C.3. Use of scientific principles in the modelling and analysis of water environment and of water infrastructure operation;
C.4. Aid to 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 water environment and in water infrastructure operation;
C.5. Originality in the creation of new products or methodologies or research outputs through synthesis of ideas from a wide range of sources;
C.6. Ability to produce solutions for problems through the application of engineering and water environment knowledge and understanding.

Area D - Key (transferable) skills
D.1. Management, transformation and presentation of data in a variety of ways;
D.2. Use of methods based on scientific evidence in the solution of problems;
D.3. Use of initiative, creativity and innovation in problem solving;
D.4. Effective communication in English (including written, oral and poster media);
D.5. Use of generic ICT, GIS and programming skills;
D.6. Independent learning and wider time and resource management;
D.7. Collaborative approach to team working and project management;
D.8. Basic communication in one European language (written and oral) in addition to English.

Acquired skills and competencies / Teaching and Learning, Methods and Strategies

Knowledge and understanding
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.
A.2 is achieved during the Hydroinformatics phase of Semester 2.
A.3 and A.4 are achieved during Semester 3 (Thematic specialization 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.3 and A.4 is partly by the above techniques and partly by field visits, research projects carried out with industrial partners, and professional practice.

B Subject-specific/practical skills
Learning B.1 is principally through lectures and tutorials in Semester 1 and 2.
B.2 to B.4 are learnt in Semesters 2 and 3 during more intensive modules addressing specialist themes and Hydroinformatics methods: these include more hands-on computer laboratories and design-based activities.
B.5 and B.6 are primarily developed and practiced in Semester 4 during the research project or professional practice.

C Cognitive skills
Fundamental aspects of C.1 are developed in Semester 1 (Basic courses in mathematics/physics/hydraulics etc.). Subsequently,
C.1 to C.6 are primarily acquired in Semesters 2 and 3 during the intensive modules addressing specialist themes and hydroinformatics methods which include more hands-on computer laboratories and design-based activities.
C.5 and C.6 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.

D Key (transferable) skills
Outcomes D.1, D.2 and D.5 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.8 (communication in 2 European languages in addition to English) is addressed with a module in Semesters 1 and 3.
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.
D.1 to D.7 are developed further and practiced in coursework assignments in Semesters 2 and 3. Subsequently, the principal development of transferable skills (D.4, D.8 and D.6 in particular) occurs through involvement in the research project or professional practice.

Acquired skills and competencies / Assessment strategy and methods

A Knowledge and understanding
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 master thesis.

B Subject-specific/practical skills
B.1 and B.2 are explicitly assessed in Semester 2 and 3 modules. Other outcomes B.3 to B.6 are not explicitly assessed, but all are necessary for the successful completion of coursework and project requirements.

C Cognitive skills
Closed-book examinations are used to assess intellectual abilities. Assessed coursework provides further opportunities to demonstrate intellect and ability. The master thesis provides final evidence of the levels attained.

D Key (transferable) skills
Skills D.1 to D.3 are essential to complete examinations and assignments to a satisfactory standard.
Acquisition of D.4 is demonstrated during assessment of coursework and of the project. D.5 is explicitly assessed in GIS and ICT modules in Semester 1.
Outcomes D.5 and D.6 are essential for satisfactory completion of the coursework and the project. Completion of the project also requires the command of outcomes D.1 to D.4.

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Module titles</th>
<th>A Knowledge &amp; Understanding</th>
<th>B Practical Skills</th>
<th>C Cognitive Skills</th>
<th>D Transferable Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Semester</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module 1.6</td>
<td>European Language I skills (except English)</td>
<td></td>
<td></td>
<td></td>
<td>D.8, D.9</td>
</tr>
<tr>
<td>Module 1.7</td>
<td>Mathematics and Physics</td>
<td>A.1</td>
<td></td>
<td>C.1</td>
<td>D.1, D.2, D.5</td>
</tr>
<tr>
<td>Module 1.8</td>
<td>Hydrology and Hydraulics</td>
<td>A.1</td>
<td></td>
<td>C.1</td>
<td>D.1, D.2, D.5</td>
</tr>
<tr>
<td>Module 1.9</td>
<td>Intro to Water and Aquatic Environment Management</td>
<td>A.1</td>
<td></td>
<td>C.1</td>
<td>D.1, D.2, D.5</td>
</tr>
<tr>
<td>Module 1.10</td>
<td>Computer Skills, Databases &amp; GIS-ICT</td>
<td>A.1</td>
<td></td>
<td>C.1, C.2</td>
<td>D.1, D.2, D.5</td>
</tr>
<tr>
<td>2nd Semester</td>
<td></td>
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<tr>
<td>Module 2.2</td>
<td>Computational Hydraulics</td>
<td>A.2, A.3</td>
<td>B.2, B.3, B.4</td>
<td>C.2, C.3, C.4</td>
<td>D.1, D.5</td>
</tr>
<tr>
<td>Module 2.3</td>
<td>Software packages/Modeling of floods</td>
<td>A.2, A.3</td>
<td>B.2, B.3, B.4</td>
<td>C.2, C.3, C.4</td>
<td>D.1, D.5</td>
</tr>
<tr>
<td>Module 2.4</td>
<td>Hydroinformatics Systems Development</td>
<td>A.2, A.3, A.4</td>
<td>B.2, B.3, B.4</td>
<td>C.2, C.3, C.4</td>
<td>D.1, D.5</td>
</tr>
<tr>
<td>Module 2.5</td>
<td>Climate Change: vulnerability, impacts and adaptation</td>
<td>A.2, A.3</td>
<td>B.2, B.3, B.4</td>
<td>C.2, C.3, C.4</td>
<td>D.1, D.5</td>
</tr>
<tr>
<td>Module 2.6</td>
<td>European Language skills (English) – Thesis writing</td>
<td></td>
<td></td>
<td></td>
<td>D.4, D.6</td>
</tr>
<tr>
<td>3rd Semester</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Module 3.Y</td>
<td>Research methodology</td>
<td></td>
<td></td>
<td></td>
<td>D.1, D.3, D.4</td>
</tr>
<tr>
<td>Module 3.Z</td>
<td>Pre-Professional Training</td>
<td></td>
<td></td>
<td></td>
<td>D.1, D.3, D.4</td>
</tr>
<tr>
<td>Module 3.A</td>
<td>European Language II skills (except English)</td>
<td></td>
<td></td>
<td></td>
<td>D.8, D.9</td>
</tr>
<tr>
<td>UNS 3.1</td>
<td>Modelling methods for urban waters (sewage network, floods and waste waters)</td>
<td>A.2, A.3, A.4</td>
<td>B.2, B.3, B.4</td>
<td>C.2, C.3, C.4</td>
<td>D.1, D.5</td>
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<tr>
<td>UNS-3.4</td>
<td>Project Management and Communication</td>
<td></td>
<td></td>
<td></td>
<td>D.4, D.7</td>
</tr>
<tr>
<td>BTUC 3.2</td>
<td>Information and Process Modelling in Hydroengineering projects</td>
<td>A.2, A.3</td>
<td>B.2, B.3, B.4</td>
<td>C.2, C.3, C.4</td>
<td>D.1, D.5</td>
</tr>
<tr>
<td>BTUC 3.3</td>
<td>Geometric Modelling and Presentation Methods</td>
<td>A.2, A.3</td>
<td>B.2, B.3, B.4</td>
<td>C.2, C.3, C.4</td>
<td>D.1, D.5</td>
</tr>
<tr>
<td>BTUC 3.4</td>
<td>Monitoring, Data Acquisition and Documentation</td>
<td>A.2, A.3</td>
<td>B.2, B.3, B.4</td>
<td>C.2, C.3, C.4</td>
<td>D.1, D.5</td>
</tr>
<tr>
<td>BME 3.1</td>
<td>Modelling Methods for Inland Surface Waters</td>
<td>A.2, A.3, A.4</td>
<td>B.2, B.3, B.4</td>
<td>C.2, C.3, C.4</td>
<td>D.1, D.5</td>
</tr>
<tr>
<td>BME 3.2</td>
<td>Hydrological Modelling and Forecasting</td>
<td>A.2, A.3, A.4</td>
<td>B.2, B.3, B.4</td>
<td>C.2, C.3, C.4</td>
<td>D.1, D.5</td>
</tr>
<tr>
<td>BME 3.4</td>
<td>Advanced Hydrometry and Data Analysis in Surface Waters</td>
<td>A.2, A.3, A.4</td>
<td>B.2, B.3, B.4</td>
<td>C.2, C.3, C.4</td>
<td>D.1, D.5</td>
</tr>
<tr>
<td>UPC 3.1</td>
<td>Artificial Neural Network in Decision Support Systems</td>
<td>A.2, A.3</td>
<td>B.2, B.3, B.4</td>
<td>C.2, C.3, C.4</td>
<td>D.1, D.5</td>
</tr>
<tr>
<td>UPC 3.2</td>
<td>Flood Risk Concepts and Application in River Basin Management</td>
<td>A.2, A.3</td>
<td>B.2, B.3, B.4</td>
<td>C.2, C.3, C.4</td>
<td>D.1, D.5</td>
</tr>
<tr>
<td>UPC 3.3</td>
<td>Flood in Urban Areas</td>
<td>A.2, A.3</td>
<td>B.2, B.3, B.4</td>
<td>C.2, C.3, C.4</td>
<td>D.1, D.5</td>
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<tr>
<td>UPC-3.4</td>
<td>Real Time Control and Operation of Irrigation Canals, Rivers and Reservoirs</td>
<td>A.2, A.3, A.4</td>
<td>B.2, B.3, B.4</td>
<td>C.2, C.3, C.4</td>
<td>D.1, D.5</td>
</tr>
</tbody>
</table>

**N.B.1** - Semester 3 / Modules acquired in 3rd Country partner Institutions: As well as for modules obtained in the European partner Institutions, the knowledge and understanding, skills, qualities and other attributes in the above different areas (A to D), the acquired skills and competencies related to the modules obtained in 3rd Country partner Institutions are similarly assessed.

APPENDIX V
EUROAQUAE
ASSOCIATED MEMBERS
&
CLUB OF FRIENDS
EuroAquae Associated Members

- WMO = World Meteorological Organization
- SUEZ ENVIRONMENT = Suez Environment
- LYONNAISE DES EAUX = Lyonnaise des Eaux
- CIRSEE = Centre International de Recherche Sur l'Eau & l'Environnement
- VEOLIA ENVIRONNEMENT = Veolia Environnement
- EDF = Electricité de France
- SOGREAH = SOGREAH
- CAPITA SYMONDS = Capita Symonds
- HR WALLINGFORD = HR Wallingford
- WALLINGFORD SOFTWARE = Wallingford Software Ltd
- HALCROW GROUP = Halcrow Group Ltd
- AMGA FOUNDATION = Amga Foundation
- IRIDE AQUA GAS = Iride Aqua Gas
- DH = Danish Hydraulics Institute
- SGAD = Sociedad General de Aguas de Barcelona, SA
- CETaqua = Centro Tecnologico del Agua, Fundacion privada
- KISTERS FRANCE = Kisters France
- DHI EAU & ENVIRONNEMENT = DHI Eau & Environnement

EuroAquae Associated Members

- VEOLIA Environnement (Fr)
- Lyonnaise des Eaux (Fr)
- Agence de l’Eau Rhône-Méditerranée (Fr)
- Agence de l’Eau Seine Normandie (Fr)
- Conseil Général 06-Alpes Maritimes (Fr)
- Communauté d’Agglomération Nice – Côte d’Azur (Fr)
- Direction de l’Eau et de l’Assainissement du Département de la Seine-St Denis (Fr)
- Port Autonome du Havre (Fr)
- SOGREAH (Fr)
- DHI Eau & Environnement (Fr)
- Vattenfall Mining (De)
- Capita Symonds (UK)
- Wallingford Research (UK)
- HR Wallingford Group (UK)
- Wallingford Software (UK)
- Halcrow Group Limited (UK)
- DHI Water & Environment (DK)
- AMGA(It)
APPENDIX VI

GENERAL CALENDAR
OF A CURRENT ACADEMIC YEAR
### Year 1
- **1st of September** = Start of the academic year – semester I
- **10th of January** = End of semester I
- **15th of January** = Start of semester II in Newcastle
- **Second week of May** = Individual interview with Examination Board (Sem. III)
- **10th of July** = End of semester II

### Year 2
- **1st of September** = Start of the academic year – semester I
- **15th of December** = Start of HydroEurope online
- **Last week of February (2 weeks)** = HydroEurope in Nice (face to face)
- **8th of March** = End of semester I
- **10th of March** = Start of semester II
- **Before 31st of August** = Master thesis defence
- **31st of August** = End of semester II
- **Before 8th of September** = Graduation ceremony
APPENDIX VII

ABBREVIATIONS AND ACRONYMS
Universities of EuroAquaé Consortium:

- UNS = University of Nice - Sophia Antipolis (France)
- BTUC = Brandenburg University of Technology at Cottbus (Germany)
- BME = Budapest University of Technology and Economics (Hungary)
- NU = Newcastle University (United Kingdom)
- UPC = Technical University of Catalonia (Spain)
- NUS = National University Singapore (Singapore)
- IITM = Indian Institute of Technology Madras (India)
- IU = Incheon University (Korea)
- ETH = Swiss Federal Institutes of Technology Zurich (Switzerland)
- EPFL = Swiss Federal Institutes of Technology Lausanne (Switzerland)
- UNL = Universidad Nacional del Litoral (Argentina)

EuroAquaé Boards:

- CB = Consortium Board
- MCB = Management and Curriculum Board
- EX = Examination Board
- AT = Academic Tutor
- DS = Diploma Supplement
- FHEQ = Frameworks for High Education Quality
- ECTS = European Credit Transfer System
- EAAA = EuroAquaé Alumni Association
- EMA = Erasmus Mundus Students and Alumni Associations
- GIS = Geographical Information System
- IELTS = International English Language Testing System
- IT = Institution Tutor
- MSc = Master of Science
- PhD = Philosophical Doctorate
- QA = Quality Assessment
- R&D = Research and Development
- TOEFL = Test of English as a Foreign Language
- TOEFL PBT = Paper Based TOEFL
- TOEFL CBT = Computer Based TOEFL
- TOEFL IBT = Internet Based TOEFL
- WFD = European Water Framework Directive