EURO-INF

FRAMEWORK STANDARDS

AND

ACCREDITATION CRITERIA

FOR

INFORMATICS DEGREE PROGRAMMES

as adopted by the Executive Board of

EQANIE

European Quality Assurance Network for Informatics Education

EQANIE

European Quality Assurance Network for Informatics Education

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Preamble

This document is intended to provide a means for reviewing the quality of higher education informatics* qualifications in the European Higher Education Area (EHEA), in a way that encourages the dissemination of good practice and a culture of continuous improvement of informatics degree programmes. They have been developed within the Euro-Inf Project, the principal aim of which is to develop a framework for the accreditation of informatics degree programmes in the EHEA. Given the great diversity of informatics education across Europe, the attempt to create framework standards comprising all areas of the informatics discipline appears ambitious. The Euro-Inf Framework is thus intended as a *Principal aim* broad common denominator, or overarching reference point, for the variety of informatics degree programmes. In order to allow for possible inclusion of existing informatics specialisations within European Higher Education Institutions (HEIs), the framework must be formulated in rather general terms. The Standards and Criteria contained in this document represent a quality threshold. All graduates of degree programmes assessed against the Euro-Inf Standards are expected to achieve the programme learning outcomes stated therein.

The objective of the Lisbon strategy to create a "knowledge-based society", and thus to enhance competitiveness and employability throughout Europe requires reform of higher education systems within Europe. In this context, the Bologna Process aims at establishing a European Higher Education Area by 2010. The European Commission is supporting projects aiming to contribute to this reform process. As outlined by the European Ministers of Education in Berlin in September 2003, quality of higher education is "at the heart of the setting up of a European Higher Education Area". Informatics is certainly to be ranked as a *Background* strategically important discipline given the new global competitive challenge Europe faces. It is thus particularly important in the informatics area to develop quality standards for Higher Education programmes and to create and disseminate mechanisms to encourage improvement of quality of education.

Accreditation of an informatics degree programme is the primary result of a process used to ensure the suitability of that programme as providing the education base for the entry route to professional practice. It involves a periodic assessment against accepted standards of informatics higher education. Independent, third-party Accreditation is essentially based on a peer review *Accreditation* process, undertaken by appropriately trained and independent teams comprising peers from both academia and informatics practice, in accordance with agreed principles. It is important that Accreditation processes go beyond

* Where *Informatics* is indicated, *Computing* is also understood.

judgement on the achievement of a minimum standard, and effectively promote the idea of continuous improvement of the quality of Higher Education programmes.

This document can be used in both the design and the evaluation of degree programmes in all specialisations of informatics. Accreditation Criteria are expressed as broad generic programme learning outcomes that describe in general terms the capabilities required of graduates from accredited *First Cycle* and *Second Cycle* informatics degree programmes, as defined in the Framework for Qualifications of the European Higher Education Area (cf. § 7 of this section). Consequently, they can be interpreted and elaborated by users to reflect the specific demands of different cycles and specialisations.

Standards

Although this document is expressed in terms of accrediting degree programmes, it can also be used in relation to recognition of agencies that accredit (or intend to accredit) informatics programmes, in assessing the consistency of their rules and standards with the requirements of this document ('meta-accreditation'); alternatively, it can be used as a guideline for the design and development of Standards and Procedures for new Accreditation agencies. The Standards and Criteria are intended to be widely applicable and inclusive, in order to recognise the diversity of degree programmes around Europe that provide the education necessary for a graduate to enter work as an ICT (informatics) professional.

Application fields

This document describes the programme (learning) outcomes of an accredited Higher Education programme but allow for considerable variation in the emphasis of individual programmes. The development of new programmes of study or of new and different ways of delivering the curriculum is to be encouraged. HEIs are also encouraged to provide incentives for excellence in programme development and refinement but it is left to the responsibility of the HEI as to how these incentives are provided. This document does not address conditions of access to degree programmes: these are handled by HEIs, in accordance with national regulations and/or requirements including new and innovative programmes.

HEI Autonomy

Throughout this document, the term "informatics graduate" is used to describe someone who successfully completes an accredited degree programme in informatics. It is for the appropriate authority in each country to decide if a qualification, accredited or not, is sufficient for professional practice in ICT (the field of informatics) in that country, or if further education, training or industrial experience are necessary. The Euro-Inf accreditation label will assist such decisions, and particularly those that involve transnational recognition.

Professional recognition

The development of the programme learning outcomes has been informed by the

report 'A Framework for Qualifications of the European Higher Education Area' agreed by the Ministerial Conference in Bergen in May 2005, and by the Dublin Descriptors referred to therein. It is also assumed that all programmes to be accredited fulfil the criteria set out in the ENQA 'Standards and Guidelines for Quality Assurance in the European Higher Education Area' and also agreed by the Bergen Conference. Furthermore, it has been informed by the European Qualifications Framework for lifelong learning proposed by the European Commission for a Recommendation of the European Parliament and of the Council.

Further explanations on background and objectives of the Euro-Inf Project can be found in the **Annex**. It also contains a glossary where terms used in this document are explained and clarified.

1. Programme Outcomes for Accreditation

Programme Outcomes can be described as quality standards for knowledge, skills and competences that graduates of an accredited course should have achieved as the educational base for practising their profession or for post-graduate studies. They will vary in extent and intensity in accordance with the differing objectives of First and Second Cycle degree (FCD and SCD) programmes. In the Euro-Inf Framework they are arranged into the following six categories:

- Underlying Conceptual Basis for Informatics

- Analysis

- Design and Implementation

- Economic, Legal, Social, Ethical and Environmental context

- Informatics Practice

- Other Professional Competences

A wide range of degree programmes fall within the general area of informatics but all graduates should be aware of the wider spectrum of informatics and of the underlying concepts relevant to their programmes of study.The first category "Underlying Conceptual Basis for Informatics" therefore identifies capabilities that are essential to satisfying the other programme outcomes, independently from the specific informatics specialisation and application context.

"Analysis" involves the application of informatics concepts and tools to the analysis of both problems and their solutions, while "Design and Implementation" involve the creation and development of an economically viable product, process or system to meet a defined need. It involves significant technical and intellectual challenges and can be used to integrate informatics knowledge and skills to the solution of real and complex problems.

Computing activity can have impacts on individuals, on commerce, on society and on the environment. The "Economic, legal, social, ethical and environmental context" category identifies the skills that graduates need to manage their activities and to be aware of the various legal and ethical constraints under which they are expected to operate, including an understanding of the need for a high level of professional and ethical conduct in relation to activities in informatics and a knowledge of professional codes of conduct.

"Informatics practice" identifies the practical capabilities that graduates should have demonstrated through the application of informatics skills in a variety of situations. They should have demonstrated that they have an understanding of the contexts in which informatics knowledge can be applied (*e.g.* development and application of hardware and software, operation and management of informatics systems, *etc*).

Social or soft competences, listed under the category "Other Professional Competences" are crucial to communicate information, ideas, problems and solutions. Besides the so-called soft skills, the category also includes personal organisational skills, team working and life-long learning.

The same arrangement of categories is maintained for the programme outcomes of Second Cycle Degree (SCD) programmes. They apply in addition to the competences described for graduates of FCD programmes. Although all six outcome categories are used to describe expected outcomes of both FC and SC programmes, there are important differences in the requirements at the two levels. These differences in the levels of First and Second Cycle accredited informatics programmes should inform the interpretation of the programme outcomes by HEIs and by auditing teams. For instance, whereas First Cycle graduates should be able to formalise and specify real-world problems whose solution involves the use of informatics, Second Cycle graduates are, in addition, expected to have demonstrated their ability to specify and complete informatics tasks that are complex, incompletely defined or unfamiliar.

No restriction is implied or intended by this document in the design of programmes to meet the specified programme outcomes. For example, the requirements of more than one outcome could be satisfied within a single module or unit such as individual or group project work. Similarly, it is possible that some programmes are designed such that the requirements of the Other Professional Competences category are taught and assessed entirely within modules or units designed to satisfy the requirements of other outcomes, whereas in other programmes the Other Professional Competences requirements are taught and assessed in modules or units designed specifically for this purpose.

Terminology

Within this document the words *awareness* and *complex* have following meanings.

- **Awareness:** for some of the topics included in these outcomes, graduates need to have some familiarity with the topic and to know why it is important within the general context of informatics, but not necessarily in-depth knowledge of that topic.

- **Complex:** problems, artefacts or systems that are complex involve dealing simultaneously with a sizeable number of factors that interact and require deep understanding, in relation both to their analysis and to their design and implementation.

<u>Learning Outcomes for First Cycle Degree (FCD) Programmes</u>

Underlying Conceptual Basis for Informatics

Graduates of a First Cycle degree should be able to:

- describe and explain the essential facts, concepts, theories and mathematical methods relevant to computing, computing equipment, computer communication and informatics applications as appropriate to their programme of study
- outline the characteristics of relevant state-of-the-art hardware and software and their practical application
- outline relevant historical and current developments in informatics and show insight into possible future trends and developments
- apply and integrate knowledge and understanding of other informatics disciplines in support of study in their own specialist area(s)
- demonstrate awareness of the need for deep domain knowledge when creating informatics applications in other subject areas

Analysis

Graduates of a First Cycle degree should be able to:

- use a range of techniques to identify the requirements of real-world problems, analyse their complexity and assess the feasibility of their solution using informatics techniques
- describe a problem and its solution at varying levels of abstraction
- select and use relevant analytic, modelling and simulation methods
- choose appropriate solution patterns, algorithms and data structures
- analyse the extent to which an informatics system meets the criteria defined for its current use and future development

Design and Implementation

Graduates of a First Cycle degree should be able to:

- specify and design computing/network hardware/software which meet specified requirements
- describe the phases involved in different life cycle models used for specifying, building, testing and commissioning new systems and for maintaining existing systems
- select and use appropriate process models, programming environments and data management techniques for projects involving traditional applications as well as emerging application areas
- describe and explain the design of systems and interfaces for human-computer and computer-computer interaction
- apply relevant practical and programming skills to the creation of computer programs and/or other informatics artefacts

Economic, legal, social, ethical and environmental context

Graduates of a First Cycle degree should be able to:

- demonstrate awareness of the need for a high level of professional and ethical conduct in informatics and a knowledge of professional codes of conduct
- explain how commercial, industrial, economic and social contexts affect informatics practice
- identify relevant legal requirements governing informatics activities, including data protection, intellectual property rights, contracts, product safety and liability issues, personnel issues and health & safety

- explain the importance of information privacy and security issues in relation to the design, development, maintenance, monitoring and use of informatics-based systems

Informatics practice

Graduates of a First Cycle degree should be able to:

- demonstrate an awareness of appropriate codes of practice and industry standards
- describe and explain management techniques appropriate to the design, implementation, testing, deployment and maintenance of informatics systems, including project management, configuration management, change management, *etc.,* and including relevant automated techniques
- identify risk issues, including security, health & safety, environmental and commercial risk, and explain risk assessment, risk reduction and risk management techniques
- undertake literature searches and reviews using databases and other sources of information
- design and conduct appropriate practical investigations (*e.g.* of system performance), to interpret data and draw conclusions

Other Professional Skills and Competences

Graduates of a First Cycle degree should be able to:

- organise their own work independently, demonstrate initiative and exercise personal responsibility
- communicate effectively both verbally and using a variety of communications media to a variety of different audiences
- plan self-learning and improve personal performance as a foundation for lifelong learning and ongoing professional development
- identify different ways of organising teams and the various roles within a team
- participate effectively in informatics group-working

Underlying Conceptual Basis for Informatics

Graduates of a Second Cycle degree should be able to:

- demonstrate either deepened knowledge of a chosen specialisation or broadened knowledge of informatics in general
- explain in depth relevant concepts and scientific principles appropriate to their programme of study, some of which may be from outside informatics
- demonstrate awareness of topics at the forefront of their specialisation and evaluate their significance

Analysis

Graduates of a Second Cycle degree should be able to:

- apply appropriate analysis methods to the solution of complex problems in informatics and to assess their limitations
- use fundamental knowledge to investigate new and emerging technologies and methodologies
- collect and analyse research data and use appropriate analysis tools in tackling unfamiliar problems, such as those with uncertain or incomplete data or specifications, by the appropriate innovation, use or adaptation of analytical methods.

Design and Implementation

Graduates of a Second Cycle degree should be able to:

- describe and explain design processes and methodologies relevant to their subject area and be able to apply and adapt them in unfamiliar situations
- specify and complete informatics tasks that are complex, incompletely defined or unfamiliar
- apply state-of-the-art or innovative methods in problem solving, possibly involving the use of other disciplines
- demonstrate that they can think creatively to develop new and original designs, approaches, methods, *etc*

Economic, legal, social, ethical and environmental context

Graduates of a Second Cycle degree should be able to:

- demonstrate awareness of the need for a high level of professional and ethical conduct in informatics
- identify relevant legal, commercial, industrial, economic and/or social contexts appropriate to their area of study and explain their relevance
- evaluate risk and information security issues relevant to their area of study

Informatics practice

Graduates of a Second Cycle degree should be able to:

- describe and explain applicable techniques and methods for their particular area of study and identify their limitations
- apply informatics techniques to new application areas, taking account of relevant commercial, industrial, social and environmental constraints
- contribute to the further development of informatics

Other Professional Competences

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Graduates of a Second Cycle degree should be able to

- organise their own work independently, demonstrating initiative and exercising personal responsibility
- appreciate the skills required to work with and lead a team that may be composed of people from different disciplines and different levels of qualification
- undertake literature searches and reviews using databases and other sources of information
- communicate effectively both verbally and using a variety of communications media to a variety of different audiences and preferably also in a second language
- plan self-learning and improve personal performance as a foundation for lifelong learning and ongoing professional development

2. Guidelines for Programme Assessment and Programme Accreditation[1]

2.1. Guidelines for the Criteria and Requirements of Programme Assessment

Each informatics programme for which a Higher Education Institution seeks accreditation or reaccreditation against Euro-Inf Standards must be consistent with legal and national requirements and have in place:

- programme educational objectives consistent with the mission of the Higher Education Institution, the priorities of the relevant Department(s) and the needs of relevant stakeholders (such as students, relevant employers, informatics associations or societies, etc.) as well as programme learning outcomes consistent with the programme educational objectives and the specified programme learning outcomes for accreditation (cf. Sections 1.1 and 1.2)

- a curriculum and related processes which ensure achievement of the learning outcomes

- academic and support staff, facilities, financial resources and any cooperation agreements with industry, research institutions and/or other Higher Education Institutions necessary to deliver the learning outcomes

- appropriate forms of assessment which can validly attest to the achievement by graduating students of the programme learning outcomes

- a management system able to ensure the systematic achievement of the learning outcomes and the continual improvement of the programme.

Correspondingly, the guidelines for a program assessment submitted for accreditation must at least specify the following items:

a) Relevant Information on the HEI Offering the Programme

b) The Programme Needs, Objectives and Learning Outcomes

c) Relevant and Effective Educational Processes

d) Appropriate Resources and Partnerships

e) Adequate Assessment of the Educational Process and

f) An Effective Management System.

The detailed criteria to be assessed within this framework and the associated "requirements" listed in the following Table in the form of questions, valid for both FCD and SCD programmes, should be addressed when assessing an informatics programme for accreditation.

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[1] In general, assessment procedures should be in line with the Standards and Guidelines for Quality Assurance in the European Higher Education Area, The European Association for Quality Assurance in Higher Education (ENQA), Helsinki, 2005.

URL: www.bologna-bergen2005.no/Docs/00-Main_doc/050221_ENQA_report.pdf (2007-08-10).

Guidelines for Assessment	Criteria to be Assessed	Requirements	What the Self-Assessment Report (cf. Section 3.1) Should Give Evidence of and the Auditing Team Should Check
1. Needs, Objectives and Outcomes	1.1 Needs of the Stakeholders	Have the needs of relevant stakeholders (such as students, potential employers, informatics societies, etc.) been explicitly identified? Do the graduates have clear labour market prospects?	Modes and periods of relationships with the stakeholders. Needs identified for each of the identified stakeholders. Placement of graduates on the labour market.
	1.2 Educational Objectives	Are the programme educational objectives consistent with the mission of the Higher Education Institution (HEI) and priorities of the HEI Department? Have relevant stakeholders been involved in formulating the objectives (such as students, employers, informatics societies, etc.)? Are the programme educational objectives accessible to the relevant stakeholders? Are the programme educational objectives feasible, capable of implementation and valid? Are the programme educational objectives oriented towards currently foreseeable specialist developments? Which other (national, regional) standards have served as references to identify the educational objectives of the subject of study?	Programme educational objectives vs. mission of the HEI, priorities of the HEI Department and needs of the stakeholders. Transparency and publicity of the programme educational objectives. Existing standards that can be drawn on when identifying the fundamental principles underlying the subject of study (e.g. specifications issued by German Accreditation Agency Specialised in Accrediting Degree Programs in Engineering, Informatics, the Natural Sciences and Mathematics; British Computer Society; Gesellschaft für Informatik; Association for Computing Machinery, GRIN (Italian Association of Informatics Professors) etc.).
	1.3 Programme Outcomes	Do the programme outcomes (knowledge, skills, competences) acquired by the graduates cover the programme outcomes specified in the EURO-INF Standards for accreditation? (cf. Section 1)	Analysis of how programme outcomes acquired by the graduates correspond to the specified EURO-INF programme learning outcomes for accreditation (cf. Section 1).
		Are the programme learning outcomes (knowledge, skills, and competences) acquired by the graduates consistent with the programme educational objectives?	Analysis of how far programme learning outcomes acquired by the graduates correspond to the programme educational objectives formulated by the HEI in the self-assessment report.
2. Educational Process	2.1 Planning	Is the curriculum adequate to enable the achievement of the defined programme educational objectives? Does the curriculum cover an educational level that corresponds to the targeted degree? Does the curriculum provide incentives for excellence? Do teaching staff, students and stakeholders such as potential employers consider the curriculum to be well-designed with respect to the targeted objectives? Does the curriculum encompass a sound didactic concept taking into account student needs such as challenge,	Curriculum (syllabus, ECTS credits, credits for course work and personal study), its transparency and publicity. Definition/description of module' characteristics (credits, contents, specific learning outcomes, assessment methods of individual modules), their transparency and publicity. Integration of professional practice (external practical experience, laboratories, projects, etc.). Final examination, thesis, project, etc. Correspondence of curriculum and modules' characteristics to the programme objectives. The teaching methods and didactic means used to support the attainment of the objectives. Planning of the delivery.

Guidelines for Assessment	Criteria to be Assessed	Requirements	What the Self-Assessment Report (cf. Section 3.1) Should Give Evidence of and the Auditing Team Should Check
		stimulation, and excitement? Is the content of the curriculum oriented towards expected specialist developments and existing standards for the subject? Does the HEI support students' mobility?	Teaching methods and techniques (fulltime, part time, parallel to or integrated in professional work, use of multimedia or telematics devices, etc.). Measures to promote excellence. Measures to take into account currently foreseeable specialist developments. Measures to promote the mobility of students on the programme.
	2.2 Delivery	Is teaching delivered according to planning?	Compliance of the delivery with the plans. Analysis of students' evaluation of taught modules. Analysis of students' and tutors' evaluation of external practical experiences. Analysis of students' mobility.
		Are counselling and support-workload provided for the students adequate to enable achievement of the modules' specific learning outcomes?	Number of staff and their workload for counselling and support to the students.
	2.3 Learning Assessment	Have examinations, projects and other assessment methods been designed to evaluate the extent to which students can demonstrate achievement of the learning outcomes of individual modules and programme outcomes throughout the programme and at its conclusion?	Examination papers and coursework (exam. papers and samples of assessed coursework, continuous assessments, project reports, to be presented during the visit). Written examinations / final theses (to be presented during the visit) Transparency and publicity of the standards and rules concerning the assessment of student performance.
3. Resources and Partnerships	3.1 Academic and Support Staff	Is the academic staff adequate to enable accomplishment of the programme outcomes? Is the academic staff deployed effectively in order to deliver an excellent curriculum? Does the HEI provide support for students learning activities at home (e.g. e-tutorials, accessibility of academic staff via email)?	Composition, competence and qualification of the teaching staff, and explanation of their 'adequacy'. Absolute and relative number of teaching staff (ratio student/full time teaching staff). Research (publications, participation in research projects, participation in conferences, etc.) and/or professional activities and consulting work of the teaching staff.
		Is the technical and administrative support staff adequate to enable achievement of the programme outcomes?	Number, composition, competence and qualification of the technical-administrative support staff.
	3.2 Learning environment	Are the lecture facilities adequate to enable the programme outcomes to be accomplished? Do they create a positive learning environment? Are research and development activities meaningfully integrated into the programme?	Lecture facilities and associated equipment available to students and explanation of their 'adequacy'.
		Are the computing facilities and course materials adequate to enable the programme outcomes to be accomplished?	Computing facilities available to students (e-learning tools, desktops/laptops, video projectors etc.).

Guidelines for Assessment	Criteria to be Assessed	Requirements	What the Self-Assessment Report (cf. Section 3.1) Should Give Evidence of and the Auditing Team Should Check
		Are any laboratories, workshops and associated equipment needed for the programme adequate to enable the programme outcomes to be accomplished?	Laboratories, workshops and associated equipment available to students.
		Are the libraries and associated equipment and services adequate to enable programme outcomes to be accomplished? Do the libraries and associated equipment create a positive learning environment? Do conditions of, and access to, learning facilities, equipment and services support an effective learning process?	Libraries and associated equipment and services available to students. Academic guidance measures for prospective and existing students. Explanation of their adequacy.
	3.3 Financial Resources	Are the available financial resources adequate to enable the programme outcomes to be accomplished? Are available financial resources used effectively in creating a positive learning environment?	Budget for teaching and support staff. Budget for running and upgrading facilities. Budget for training. Explanation of adequacy in relation to numbers on programme.
	3.4 Partnerships	Do the partnerships the HEI and the programme are participating in contribute to enabling the programme outcomes to be accomplished and facilitate the mobility of the students?	Local / regional / national / international industrial partnerships and cooperation agreements. Local / regional / national / international partnerships and cooperation agreements with research institutions. Local / regional / national / international cooperation agreements, programmes or measures with other Higher Education Institutions.
4. Assessment of Educational Process	4.1 Students	Do the students seeking enrolment in the programme have the right knowledge and attitudes to enable achievement of the programme outcomes in the expected time?	Entrance requirements. Admission requirements *(only for programmes with admission quota arrangements)*.
		Do the results related to the students' study progress attest to the achievement of the programme learning outcomes in the expected time?	Students' study progress. Learning levels achieved. Success rates / retention rates, drop out rates and time taken to complete the programme. Number of students commencing each degree programme.
	4.2 Graduates	Do graduates enter an occupation corresponding to their qualification?	Number of graduates (preliminary / intermediate / final examinations passed). Time taken to enter the workforce. Match between employment and education received.
		Do stakeholders (graduates, employers, etc.) confirm the achievement of the programme's educational objectives?	Graduates' opinions on the education received. Opinion of employers on the graduates' education.
5. Management System	5.1 Organisation and Decision-making	Are the HEI's and programme's organisation and decision-making processes adequate for enabling the programme	Documentation on HEI's and programme's organisational structures and decision-making processes (statutes, organisational

Guidelines for Assessment	Criteria to be Assessed	Requirements	What the Self-Assessment Report (cf. Section 3.1) Should Give Evidence of and the Auditing Team Should Check
	Processes	outcomes to be accomplished?	charts, management of organisational processes, etc.). Positions of responsibility for the various actions to direct and control the educational process, their relationships of link and dependence. Existence and use of effective co-ordination mechanisms of decision-making processes, both horizontal and vertical. Existence and use of reliable information sources for decision-making. Some kind of summative statement explaining compliance.
	5.2 Quality Assurance System	Are the HEI's and programme's Quality Assurance Systems effective in enabling the achievement of the programme outcomes? Is its quality assurance approach reviewed regularly? Is this concept actually being implemented and used to make improvements? Is it capable of identifying deviations from the programme educational objectives? Does it enable the revision of the educational objectives? Is information on graduate placements, where applicable, systematically collected and evaluated?	HEI's and programme's policy and procedures for quality assurance. Evaluation during educational process (e.g. student surveys). Evaluation of the success of the degree programme (e.g. Data and statistics from graduate surveys, student surveys, studies on graduate employment).
		Are the delivery process', students' and graduates' results analysed and used to promote continual improvement of the programme?	Existence of a regulated and systematic process for continual programme review, development and improvement based on the analysis of the delivery processes, students' and graduates' results. Results of improvement actions.
		Are needs, objectives and outcomes, educational process, resources and partnerships, management system periodically re-examined?	Existence of a regulated, systematic and periodic process for re-examining needs objectives and outcomes, educational process, resources and partnerships, management system. Results of re-examination activity.

2.2. Guidelines for the Evaluation of Individual Requirements

When assessing the achievement of individual requirements for the programme review, a scale with at least the following three categories should be used:

a. Acceptable without reservation

b. Acceptable with adjustment requirements

c. Unacceptable.

The outcome "acceptable without reservation" should be awarded to requirements, which have been fully met, even if improvements are still possible.

The outcome "acceptable with adjustment requirements" should be awarded to requirements, which have not been fully met, but are judged to be achievable within a reasonable period of time (as a rule no longer than half the regular full period of accreditation).

The outcome "unacceptable" should be awarded to requirements, which have not been met or fully met, and are judged not to be achievable within a reasonable period of time.

2.3. Guidelines for the Criteria of Programme Accreditation

An informatics programme is accredited if it fulfils the requirements specified under Section 2.1.

To record the assessment outcome concerning the overall achievement of the requirements, a scale with at least the following three points should be used:

a. Accredited without reservation

b. Accredited with adjustment requirements

c. Not accredited.

Accreditation without reservation, with possible specification of recommendations for the improvement of the programme, should be awarded to programmes for which all requirements are judged to be "acceptable without reservation". In this case, accreditation should be awarded for the full period of accreditation (which should not exceed six years).

Accreditation with adjustment requirements, with specification of adjustments and the time in which these must be carried out, should be awarded if one or more requirements are judged to be "acceptable with adjustment requirements". If a programme is rated as "accredited with adjustment requirements", accreditation must be awarded for a shorter period of time than the full period of accreditation, after which compliance with the adjustment requirements is verified. If the adjustment requirements are not achieved within the set period of time, the accrediting panel can recommend that accreditation be withheld.

If the assessment outcome is unacceptable, the degree programme is not accredited.

3. Procedures for Programme Assessment and Programme Accreditation

This section lists the steps the programme assessment (based on self-assessment followed by external review) and programme accreditation procedures should follow.[2] Individual accreditation agencies may add further requirements to respond to nationally and culturally distinctive features of Higher Education in informatics and to ensure compliance with national legislation.

3.1. Application by a Higher Education Institution (HEI)

The detailed self-assessment report and documentation is submitted before the visit of the assessing team (sufficient time should be allowed for review of the report).

The table in Section 2.1 may serve as guideline for the HEI in producing (and for members of the auditing team in reviewing) the self-assessment report and documentation. In any case, the self-assessment report should provide adequate information against all the questions listed in the table in Section 2.1, taking into account at least all the items listed in the last column of the table.

3.2. Guidelines for the Procedure of Programme Assessment

3.2.1. Composition of Auditing Team

The auditing team should consist of at least three persons, preferably more, representing a balance of relevant experience and expertise. At least two members of the auditing team should be academics, at least one a practitioner with a SCD or equivalent in informatics. All members of the auditing team should be adequately trained in the conduct of the accreditation process. In this regard accreditation institutions should provide (or ensure provision of) adequate training.

To facilitate the dissemination of good practice in assessment, the accreditation agency should offer the option to include external observers from outside the respective economic region.

Each member of the auditing team must provide a statement indicating that no conflict of interest exists between the HEI Department at which one or more programmes are being accredited and the panel members themselves. This statement should be received prior to any documentation being distributed.

3.2.2. Duration of the Auditing Visit

The assessment visit normally lasts at least two days, including both any preliminary meetings of the audit team and the visit to the HEI.

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[2] In line with the Standards and Guidelines for Quality Assurance in the European Higher Education Area; ibid.

URL: www.bologna-bergen2005.no/Docs/00-Main_doc/050221_ENQA_report.pdf (2007-08-10).

3.2.3. *Structure of the Auditing Visit*

The visit normally includes:

- a preliminary meeting of the auditing team prior to the visit to identify what information is to be obtained during the visit

- a meeting with head of department / university

- a meeting with academic staff members

- a meeting with support staff members

- a meeting with a representative group of students

- a meeting with former students

- a meeting with relevant employers / industry / professional informatics organisations representatives

- a visit of relevant facilities (libraries, laboratories, etc.)

- a review of project work, final thesis, examination papers and other assessed work (with regards to the standard and modes of assessment as well as to the learning achievements of the students)

- feedback by the auditing team at the end of the visit.

3.3. Guidelines for the Procedure of Programme Accreditation

3.3.1. *Verification and Validation of the Report by the Accrediting Body*

The auditing team prepares, and agrees on an assessment report. The assessment report is then submitted to the HEI to check for factual errors and (should the HEI desire) submit a statement on the report. The statement of the HEI is transmitted to the members of the auditing team for review of the assessment report and formulation of recommendation concerning the accreditation decision.

3.3.2. *Decision on Accreditation*

The final decision on accreditation should be taken by a designated board of the accreditation Agency. The accreditation decision must clearly define the period of validity (the duration of which should not exceed a maximum of six years) and whether it refers to year of entry or year of graduation. After the limited validity of the accreditation has expired, the programme must be submitted to re-accreditation.

The accreditation decision is then communicated to the HEI.

3.3.3. Publication

The list of accredited programmes must be made available to the public by each accreditation institution. The following section (Section 4) presents a recommended template for the publication; it will have to be adapted to national legislation.

4. Recommended Template for Publication of Results

Higher Education Institution (name in original language and in English)	
Country	
State/Province (where applicable)	
Name of the Programme (name in original language and in English)	
Degree Awarded	
Qualification Level (First Cycle / Second Cycle)	
Programme Objectives; Profile (where applicable)	
Programme Duration (Semesters; in case of "terms" of different length, indicate them and the equivalent in semesters)	Semesters
Total Number of ECTS Credits Awarded	ECTS cp
Curriculum Analysis (% and credits)**:** ◦ **informatics fundamentals** ◦ **advanced subjects (including final thesis)** ◦ **mathematics / natural sciences fundamentals** ◦ **interdisciplinary contents**	
Brief Description of the Programme	
Examples of Very Good Practice (where applicable)	
Accredited without / with Adjustment Requirements	
Adjustment Requirements (where applicable)	
Accredited by (agency, country)	
Accredited (from ... to …)	

5. Appeal Mechanism

Agencies or other national competent authorities that make accreditation decisions on the basis of the Euro-Inf Standards and Criteria should have an appeals procedure. The nature and form of the appeals procedure should be determined in the light of the constitution of each agency.

It should be evident from the documentation to what extent the appeals system is based on a hearing process through which the agency can provide those under evaluation a means to comment on and question the outcomes of the evaluation. Basically, the agency should provide evidence that the appeals system provides for those under evaluation an opportunity to express opinions about evaluation outcomes.