1. Framework

As a result of the implementation of the Bologna process into Portuguese Higher Education system (decree-law 42/2005) there has been a need to put in place a European grading comparison scale (hereinafter also referred to as ECTS grading scale). This scale allows to establish a correspondence with the current numerical scale in Higher Education Institutions, and must be applied to the final grades obtained by graduates and to the grades of each course unit.

The ECTS classification represents an additional information to the grades obtained by a student and allows for placing his results in an intelligible form by everyone, without interfering with the regular process of evaluation of each institution.

Drawing on the principles stated in Decree-law 42/2005 (Section II) and the recommendations for implementation issued by the Portuguese Directorate-General for Higher Education, the application of this scale at IST must be made according to the provisions laid down in this document.

2. Assumptions

The application of the ECTS system to a course unit/module is based on the distribution of grades obtained by all the students approved in that course unit/module in the previous three academic years considered in the application.

The application of this scale of comparability to the final grade of a 3rd cycle programme (Good, Very Good, With Appraisal) must correspond to the ECTS grade of the academic component, which is based on a 10 to 20 scale. If a student does not have an academic component grade, it must correspond to the academic component grade of the pre-Bologna MSc programme, if there has been such equivalence. Otherwise, the grade will be a C (because it is impossible to make out the student positioning).

The total number of approved/graduate students in that period must be greater than 30. If this dimension is not reached for that period, the period covered will evolve, at each stage, to: (i) the previous 4th year; (ii) the previous 5th year. If this dimension is not reached according to the provisions laid down in these subparagraphs, the ECTS grading system will not apply to that course unit/module through the procedure defined in the methodology (chapter 3).

In these cases, the application of the ECTS grading scale will be made through a reference table, as follows:

---

[1] Adopted in a meeting of the Executive Board of 1/07/2008 and reviewed (and adopted) on 01/07/2009.

a) As for final grades of 1st and 2nd cycle programmes, the reference table will be developed based on the final grades of all graduated students from IST in the same degree during the preceding three academic years, to which the proposed methodology applies (chapter 3);

b) As for grades of course units taught at 1st and 2nd cycles, the reference table will be developed by each year of study based on the grades of all course units of the programme in that year of study obtained in the preceding three academic years, to which the proposed methodology applies (paragraph 3).

   If, in the preceding three academic years, the academic year of that course unit does not exist (recent programmes), the reference table will be developed by year of study, based on the grade of all course units of IST for that year of study, regardless of the course programme, in the preceding three academic years, to which the proposed methodology applies (chapter 3).

c) As for final grades of 3rd year programmes, the reference table will be developed based on the final grades of the academic component of all graduates from IST in the same degree in the preceding three academic years, to which the proposed methodology applies (chapter 3).

d) As for grades of course units of 3rd cycle programmes, the reference table will be developed based on the grades of all course units in the preceding three academic years, to which the proposed methodology applies (chapter 3);

   If, in these three academic years, the number of students approved in the whole of course units is not greater than 30, then the reference table will be developed based on the grades of all course units of 3rd cycle programmes taught at IST, regardless of the programme, in the previous three academic years, to which the proposed methodology applies (chapter 3).

3. Methodology

The application of this scale of comparability aims to obtain a distribution profile of students within A-B-C-D-E segments, which corresponds to 10%-25%-30%-25%-10% of the students approved, i.e., the intervals between grades must correspond to 10%, 35%, 65% and 90% of the total number of achieving students. In this regard, the procedure to be adopted in order to obtain a distribution that is as much adjustable as possible must be the one provided in the attached algorithm.

This procedure, as described in the format of an algorithm (chapter 2), ensures the best possible adjustment of the percentages of students allowed in each ECTS segment, so that the boundaries of both systems can be as close as possible. With this methodology, some ECTS grades may not be assigned.

This system was implemented at IST in the 2006/07 academic year. For the purposes of production of the diploma supplement, all grades obtained in preceding academic years must refer to the distribution found in 2006/07, or to the corresponding reference table if the course unit does not exist in that academic year.

In course units of programmes taught in the 3rd cycle, and until there is a minimum number of students approved (30 or higher) in the whole of this cycle' course units (chapter 2. d)), the application of the ECTS grading system must consider the grades of course units of the pre-Bologna MSc programmes.

As for 1st and 2nd cycle graduates, the application of the ECTS grading system must consider the distribution of graduates in pre-Bologna programmes, until the minimum number foreseen in the application assumptions is reached (chapter 2).

As for 3rd cycle graduates, the application of the ECTS grading system must consider, as in course units, the data of pre-Bologna MSc programmes, until the minimum number foreseen in the application assumptions is reached (chapter 2).

5. Final Remarks

The information on the European scale of comparability of classifications to be applied in each academic year must be available on the electronic address of the respective course unit and programme, in the case of programme final grades.

6. Algorithm

Algorithm's Notation

- The designation **classification** refers to the **ECTS** grading scale (A, B, C, D, E)
- The designation **grade** refers to the **National** grading scale (10, ..., 20)
- **T** – number of students approved in the course unit
- **C_i** – fraction of universe T with ECTS classification in the scale i (i=A, B, C, D, E)
- **N_j** – fraction of universe T with grade j (j=10, 11, ... , 19, 20)
- **S_j** = $\sum_{i=j}^{20} N_i$ - fraction of universe T with grade greater than j (j=10, 11, ... , 19, 20)
- **m_T** – lowest grade assigned to the students approved in the universe T
- **M_T** – highest grade assigned to the students approved in the universe T
- **m_i** – minimum grade of the scale i
- **M_i** – maximum grade of the scale i

Algorithm's Description

1. Assignement of Classification A	
Maximum grade is defined by the fraction of universe T that sums at least 10% of the students approved (10%A).	Set the highest value of a such as $S_a \geq 0.10$.
Considering the sum of grade immediately above, it is verified which of the sums approaches more those 10%, i.e., with which the smallest difference to 10% is obtained.	If a = 20 then $S_{21} = 0$, otherwise, for this value of a, consider S_{a+1}. If $\lvert S_a - 0.10 \rvert \leq \lvert S_{a+1} - 0.10 \rvert$
Classification A is set depending on the case that best fits. (% of students, min. and max. grade).	then $C_A = S_a$, $M_A = M_T$ and $m_A = a$ otherwise, for a < 20 it becomes $C_A = S_{a+1}$, $M_A = M_T$ and $m_A = a+1$, for a = 20 it isn't assigned the Classification A ($C_A=0$; $M_A=21$, $m_A=21$)

The classification A, if it exists, it's assigned to all the students with grade within the set {m_A,..., M_A}.

2. Assignement of Classification B	
Maximum grade is defined by the fraction of universe T that sums at least 35% of the students approved (10%A+25%B).	Set the highest value of b such as $S_b \geq 0.35$.
Considering the sum of grade immediately above, it is verified which of the sums approaches more those 35%, i.e., with which the smallest difference to 35% is obtained.	If b = 20 then $S_{21} = 0$, otherwise, for this value of b, consider S_{b+1}. If $\lvert S_b - 0.35 \rvert \leq \lvert S_{b+1} - 0.35 \rvert$
Classification B is set depending on the case that best fits. (% of students, min. and max. grade).	then $C_B = S_b - C_A$, $M_B = m_A - 1$ and $m_B = b$ otherwise for b < 20 it becomes $C_B = S_{b+1} - C_A$, $M_B = m_A - 1$ and $m_B = b+1$ for b = 20 it isn't assigned the Classification B ($C_B=0$; $M_B=21$, $m_B=21$)

The classification B, if it exists, it's assigned to all the students with grade within the set {m_B,..., M_B}

3. Assignement of Classification C	
Maximum grade is defined by the fraction of universe T that sums at least 65% of the students approved (10%A+25%B+30%C).	Set the highest value of c such as $S_c \geq 0.65$.
Considering the sum of grade immediately above, it is verified which of the sums approaches more those 65%, i.e., with which the smallest difference to 65% is obtained.	If c=20 then $S_{21} = 0$, otherwise, for this value of c, consider S_{c+1}. If $\lvert S_c - 0.65 \rvert \leq \lvert S_{c+1} - 0.65 \rvert$
Classification C is set depending on the case that best fits. (% of students, min. and max. grade).	then $C_C = S_C - C_A - C_B$, $M_C = m_B - 1$ and $m_C = c$ otherwise for c < 20 it becomes $C_C = S_{c+1} - C_A - C_B$, $M_C = m_B - 1$ and $m_C = c+1$ for c = 20 it isn't assigned the Classification C ($C_C=0$; $M_C=21$, $m_C=21$)

The classification C, if it exists, it's assigned to all the students with grade within the set {m_C,..., M_C}

4. Assignement of Classification D	
Maximum grade is defined by the fraction of universe T that sums at least 90% of the students approved (10%A+25%B+30%C+25%D).	Set the highest value of d such as $S_d \geq 0.90$.
Considering the sum of grade immediately above, it is verified which of the sums approaches more those 90%, i.e., with which the smallest difference to 90% is obtained.	For this value of d, consider S_{d+1}. If $\lvert S_d - 0.90 \rvert \leq \lvert S_{d+1} - 0.90 \rvert$
Classification D is set depending on the case that best fits. (% of students, min. and max. grade).	then $C_D = S_d - C_A - C_B - C_C$, $M_D = m_C - 1$ and $m_D = d$ otherwise it becomes $C_D = S_{d+1} - C_A - C_B - C_C$, $M_D = m_C - 1$ and $m_D = d+1$

The classification D, if it exists, it's assigned to all the students with grade within the set {m_D,..., M_D}

5. Assignement of Classification E	
The Classification E will contain the remaining universe of students/grades.	Make $C_E = 1 - C_A - C_B - C_C - C_D$, If $C_E > 0$ then $M_E = m_D - 1$ and $m_E = m_T$.

The classification E, if it exists, it's assigned to all the students with grade within the set {m_E,..., M_E}