GUIDELINES FOR CONVERSION OF CGPA AND GRADING OF COURSES REPORT

Committee members:

1.	Prof. M. Thamban Nair	MA	Chairman
2.	Prof. A. Kannan	CH	Member
3.	Prof. Suresh Govindarajan	PH	Member
4.	Dr. Shankar Balachandran	CS	Member
5.	Dr. Palaniappan Ramu	ED	Member
6.	Dr. Shaligram Tiwari	ME	Member
7.	Dr. Rahul Ratnakar Marathe	MS	Member
8.	Dr. Gaurav Raina	EE	Member

The Task: To propose the following.

1. Guidelines for conversion of CGPA (4, 5, 8 and 10 scale) into equivalent percentage for the purpose of admission to MS/Ph.D. programme, and placement purposes.
2. Guidelines for grading of courses (large, medium and small).

Apart from having discussion through emails, the committee members met four times:

- September 19, 2013 (Thursday), 3:30-5:00 hrs,
- October 7, 2013 (Monday), 3:00 - 4:30 hrs.
- November 4, 2013 (Monday), 4:00-5:00 hrs., and
- November 25, 2013 (Monday), 11:30-12:30 hrs.

at the Conference Room of the Department of Mathematics, and discussed all issues pertaining to the task.

1. Guidelines for conversion of CGPA into percentage

The committee first considered the issue of evolving a formula when the CGPA is calculated under **scale 10**. The members felt that conversion of CGPA under other scales can be proportionally converted into percentage.

1.1. **Requirements.** Members agreed on the following points:

(1) The formula should be simple so that it can be used easily by the admission committee, and can be understood easily by others, including administrative staff, students and general public.
(2) As consideration of CGPA/Percentage is required for MS and PhD admission, a formula is required to fix the cut-offs at the screening level.
(3) The cut-off at the screening level has to be fixed by each admission committee in terms of either CGPA or Percentage.
(4) In view of the above, a formula is required only for the following purposes:
    (a) If the admission committee decides to have certain CGPA as cut-off, then the committee needs to fix certain Percentage cut-off for the purpose of screening of those candidates who come with marks in percentage. So, a formula has to be used for such purpose.
    (b) If the admission committee decides to have certain Percentage as cut-off, then the committee needs to fix certain CGPA cut-off for the purpose of screening of those candidates who come with CGPA. So, a formula has to be used for such purpose, as well.
(5) Cut-off CGPA/Percentage has to be fixed under the premise that the admission committee wanted more number of candidates (including those falling under reserved categories) with lower CGPA/Percentage to appear for the test/interview.

1.2. **Formulae.** With the above requirements in mind, the committee examined some of the formulae in vogue, under the scale 10. They include

(i) Formula which is being used by AICTE and IIT Madras presently:

$$\textbf{Percentage} = \textbf{10} \times \textbf{CGPA} - \textbf{7.5},$$

equivalently, $\textbf{Percentage} = \textbf{52.5} + \textbf{10}\,(\textbf{CGPA} - \textbf{6})$.

(ii) Formula which is being used by some NITs[1] and CUSAT:

$$\textbf{Percentage} = \textbf{10} \times \textbf{CGPA} - \textbf{5},$$

equivalently, $\textbf{Percentage} = \textbf{55} + \textbf{10}(\textbf{CGPA} - \textbf{6})$.

Looking at the above two formulae, the committee felt that the formula in (i) is not suitable as it overvalues Percentage, in the sense that, if certain Percentage is fixed as cut-off, then the requirement of the corresponding CGPA is relatively high.

[1]e.g. Sardar Patel NIT (Surat) and Malaviya NIT (Jaipur)

The committee also looked at some other possibilities. After considering various options, one suitable formula arrived at is the following:

$$\textbf{Percentage} = \textbf{50} + \textbf{8.5}(\textbf{CGPA} - \textbf{5}),$$

equivalently, $\textbf{Percentage} = \textbf{8.5} \times \textbf{CGPA} + \textbf{7.5}$.

With the requirements in mind, the committee settled with the following two formulae for consideration:

Formula - I: $\textbf{Percentage} = \textbf{55} + \textbf{10}(\textbf{CGPA} - \textbf{6})$

Formula - II: $\textbf{Percentage} = \textbf{50} + \textbf{8.5}(\textbf{CGPA} - \textbf{5})$.

In the following tables we give the conversion of the CGPA into Percentage and vice versa under Formula-I and Formula-II.

In the tables,

- x and Y stand for CGPA and Percentage, respectively,
- Y_1, Y_2 stand for Percentages under Formula-I, Formula-II, respectively, corresponding to the CGPA x, and
- x_1, x_2 stand for CGPA under Formula-I, Formula-II, respectively, corresponding to the Percentage Y.

Table 1: $CGPA \mapsto Percentage$:

x	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10
Y_1	45	50	55	60	65	70	75	80	85	90	95
Y_2	50	54.25	58.5	62.75	67	71.25	75.5	79.75	84	88.25	92.50

Table 2: $Percentage \mapsto CGPA$:

Y	45	50	55	60	65	70	75	80	85	90	92.5	95	100
x_1	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	9.75	10	10+
x_2	4.41	5.0	5.59	6.18	6.76	7.35	7.94	8.53	9.12	9.71	10	10+	10+

1.3. **Illustrating Example:** We consider two cases for the purpose of illustration:

Case (a): Suppose that the cut-off is in terms of CGPA, say CGPA=6.5.

- Under Formula -I, all candidates with Mark $\geq 60\%$ are eligible to appear for test/interview,
- Under Formula -II, all candidates with Mark $\geq 62.75\%$ are eligible to appear for test/interview.

Thus, as per the requirement (5) , Formula-I is better than Formula-II.

Case (b): Suppose that the cut-off is in terms of Percentage of marks, say 60%.

- Under Formula -I, all candidates with CGPA ≥ 6.5 are eligible to appear for test/interview,
- Under Formula -II, all candidates with CGPA ≥ 6.18 are eligible to appear for test/interview.

Thus, as per the requirement (5), Formula-II is better than Formula-I.

1.4. **Recommendation.** Keeping in mind the requirements, specifically the requirement in item (5), the **committee recommends the following**:

(1) Adopt Formula-I if the cut-off is fixed in terms of CGPA, and use the formula

$$\mathbf{Percentage} = \mathbf{10} \times \mathbf{CGPA} - \mathbf{5},$$

to fix the corresponding Percentage cut-off.

(2) Adopt Formula-II if the cut-off is fixed in terms of Percentage, and use the formula

$$\mathbf{CGPA} = \frac{\mathbf{Percentage} - \mathbf{7.5}}{\mathbf{8.5}}$$

to fix the corresponding CGPA cut-off.

(3) If CGPA is given under a scale different from 10, say scale $G \neq 10$, then the corresponding percentage is calculated proportionally. Thus, if $(CGPA)_G$ is the CGPA under the scale G, then the CGPA under the scale 10 is given by

$$(\mathbf{CGPA})_{\mathbf{10}} = \frac{\mathbf{10}}{\mathbf{G}}(\mathbf{CGPA})_{\mathbf{G}}.$$

2. Guidelines for Grading

2.1. **Existing guidelines.** The committee first studied the existing guidelines for grading large classes.

Denoting the average by μ and the standard deviation by σ the existing guidelines are the following:

Grade	From (cut-off)	To (<)	≈ %
S	$\mu + 1.65\,\sigma$	–	5 %
A	$\mu + 0.85\sigma$	$\mu + 1.65\,\sigma$	15 %
B	$\mu + 0.00\,\sigma$	$\mu + 0.85\,\sigma$	30 %
C	$\mu - 0.85\,\sigma$	$\mu + 0.00\,\sigma$	30 %
D	$\mu - 1.65\,\sigma$	$\mu - 0.85\,\sigma$	15 %
E & U	–	$\mu - 1.65\,\sigma$	5 %

Observation: In the above, the average μ is kept as the cut-off for B grade. The members felt that this looks too liberal which is normally not followed by us. The prevailing practice is to have μ lie between the cut-offs for B and C.

2.2. **Recommendation.** Taking into account the above observation, the **committee recommends** the following guidelines for cut-offs for different grades. As in the case of the existing guideline, the cut-off for E grade is left to the teacher to decide.

Grade	From (cut-off)	To (<)	≈ %
S	$\mu + 1.65\sigma$	–	5 %
A	$\mu + 0.85\sigma$	$\mu + 1.65\sigma$	15 %
B	$\mu + 0.12\sigma$	$\mu + 0.85\sigma$	25 %
C	$\mu - 0.65\sigma$	$\mu + 0.12\sigma$	30 %
D	$\mu - 1.3\sigma$	$\mu - 0.65\sigma$	15 %
E & U	–	$\mu - 1.3\sigma$	10 %

The above recommendation is for large classes of size more than 50. For classes with medium strength (20-50), the committee **recommends** the following quantiles for groups of grades:

Grades	≈ %
S, A, B	Top 45 %
C, D	Next 45 %
E, U	Next 10 %

For classes of small strength, no specific guideline is recommended.

Note: Although a marginal reduction is effected in the range for B grade, the committee did not want to be too strict on this, mainly because, 8 CGPA is considered as a reasonable requirement for many purposes. However, in the lower end of the spectrum of grades, the committee recommends tighter cut offs for grade C and grade D. Hence poor performance will lead to more E and U grades.

Names and signatures of members of the committee

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