NORMALIZATION OF MARKS: HOW IT WORKS

Entrance Examinations are taken by candidates coming from different streams of study such as the Kerala Higher Secondary, AISSCE of the Central Board of Secondary Education, ISC Examination of the Council for Indian Schools Certificate Examination and also the Plus two level examinations of various State Boards, Vocational Higher Secondary Examination of Kerala etc.

Normalization of marks in the qualifying examination in respect of the subjects considered for ranking purposes is the process of making the marks obtained by students from streams other than Kerala Higher Secondary, in the subjects concerned, comparable to that of the Kerala Higher Secondary stream.

The marks in respect of candidates who have come from the Kerala Higher Secondary stream will not be subjected to any Normalization. The marks obtained by such candidates in the subjects considered will be taken as such for ranking purposes.

The Normalization of marks of candidates of other streams would be carried out as per the formula given under Clause **9.7.4 (b) (ii)** of the Prospectus for Admission to Professional Degree Courses, Kerala, 2011.

This formula is arrived at through different stages as described below.

Stage I: Consider a candidate of any other stream 'O', (may be CBSE/CISCE/Other State Board etc), who had passed the Plus Two Examination with Mathematics, Physics and Chemistry. Let the score of the candidate in Mathematics be X_O **(See Col 4, Table III).**

Normalisation of marks in Mathematics:

Let the average mark of all students who have taken the examination in Mathematics, along with the candidate, in the particular year, in the 'Other' stream and who have passed in the subject be 'M_O' **(See Table I)**

Let the standard Deviation of marks of students who have taken the examination along with the candidate in the particular year in the 'Other' stream and who have passed the Examination, be 'S_O' **(See Table I)**

[Standard deviation is a measure of the extend of variation in the values considered-here marks of students who have taken the examination in the particular year in the 'Other' stream and who have passed the Examination and is computed as $\sqrt{\frac{\sum (X_O - M_O)^2}{n}}$ where X_O is the mark of a student, M_O the average mark of the students who have passed in the

subject and n, the number of candidates who have passed in the subject] **(See Table IV for an example)**

Based on the mean and standard deviation of marks, an index of the relative performance of the candidate in the 'Other' stream is computed as, $\left(\frac{X_O - M_{O)}}{S_O}\right)$.**(See Col 5, Table III)**

Stage II: Let the average mark and Standard Deviation of marks of all students who have taken the examination in Mathematics, in Kerala Higher Secondary stream ('H'), in the particular year and who have passed in the subject be 'M_H' and 'S_H' respectively. **(See Table II)**

Let 'Y_{OH}' denote the equivalent mark in Mathematics, which the candidate considered under the 'Other' stream, should get in the Kerala Higher Secondary stream, in order to get the same index of performance that the candidate got in the 'Other' stream.

If so, the Index of performance of this candidate in Mathematics in the Kerala Higher Secondary stream may be computed as $\left(\frac{Y_{OH} - M_H}{S_H}\right)$

Stage III: Since Y_{OH} is determined so as to retain the same index of performance, the two indices representing the relative performance of the candidate in 'Other' stream and Kerala Higher Secondary Streams are equal.

So, the two values, $\left(\frac{Y_{OH} - M_H}{S_H}\right)$ and $\left(\frac{X_O - M_{O)}}{S_O}\right)$ can be equated.

Thus $$\left(\frac{Y_{OH} - M_H}{S_H}\right) = \left(\frac{X_O - M_{O)}}{S_O}\right)$$

Solving,

$$Y_{OH} = M_H + S_H\left(\frac{X_O - M_O}{S_O}\right)$$

(See Clause 9.7.4 (b) (ii) of the Prospectus for admission to Professional Degree Courses, Kerala, 2011)

Here, Y_{OH} will be Normalized mark of the candidate of the 'Other' stream in Mathematics. **(See Col 6, Table III)**

Stage IV: The Normalised marks for Physics and Chemistry are also determined in the manner described in Pre-paras. This completes the process of Normalisation.

TABLE I
Characteristics of Mark of Other Streams (O)

STREAM	**SUBJECT**	MEAN MARK (M_O)	STANDARD DEVIATION OF MARK (S_O)
A	Mathematics	78	15
B	Mathematics	85	17
C	Mathematics	90	16

Table II
Characteristics of Mark of Kerala Higher Secondary (H)

STREAM	SUBJECT	MEAN MARK (M_H)	STANDARD DEVIATION OF MARK (S_H)
Higher Secondary Kerala	Mathematics	88	15

Table III
Normalised Marks of Students of Other Stream

STUDENT	**Stream**	**SUBJECT**	**Mark Secured by student** (X_O)	$\left(\frac{X_O - M_{O)}}{S_O}\right)$	Normalized Mark of the student $Y_{OH} = M_H + S_H\left(\frac{X_O - M_O}{S_O}\right)$
1	A	Mathematics	82	0.2667	$Y_{OH} = 88 + (15 \times 0.2667) = 92.0005$
2	A	Mathematics	74	-0.2667	$Y_{OH} = 88 + (15 \times -0.2667) = 83.9995$
3	B	Mathematics	85	0	$Y_{OH} = 88 + (15 \times 0) = 88$
4	C	Mathematics	94	0.25	$Y_{OH} = 88 + (15 \times 0.25) = 91.75$

Table IV
Computing Mean and Standard Deviation for a set of marks

Student	Marks (X_O)	$X_o - M_o$	$(X_o - M_o)^2$
1	50	-20	400
2	60	-10	100
3	70	0	0
4	80	10	100
5	90	20	400
Total	$\sum X_o$ = 350		$\sum (X_o - M_o)^2$ = 1000

Mean Mark = $\frac{\sum X_o}{n}$ **OR** $\frac{Total \quad Mark}{Number \quad of \quad students} = \frac{350}{5} = 70$

Standard Deviation of marks = $\sqrt{\frac{\sum (X_o - M_o)^2}{n}} = \sqrt{\frac{1000}{5}} = \sqrt{200} = 14.1421$