

## Semester performance index and cumulative performance index: the latest grading of marks in mark sheets of semester system in technical courses

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### ABSTRACT

A "semester" (from the Latin meaning "six-monthly") has come to mean either of two academic terms, generally excluding the summer or January terms, if any, and so can be 12 to 20 weeks long. The word "semester" is sometimes used as a synonym for a "term", as in a "summer semester". A "trimester" (from the Latin meaning "three-monthly") divides the academic year into three periods, separated by breaks. In some jurisdictions, "trimester" is used in its original meaning to indicate a quarter system (since three months is exactly a quarter of a year), or a variation of it. A "quarter" system treats the summer term on an equal footing with the other terms. It divides the academic year into four quarters, each of which is usually 12 weeks long. Three of the four quarters (Fall, Winter and Spring, operating from September until June or from August until May) are thus equivalent to two 18-week semesters. Thus, when American academic universities convert academic credits between the semester/trimester and quarter systems, 36 quarter hours convert to 24 semester hours (2/3 conversion factor) while 36 semester hours convert to 54 quarter hours (3/2 conversion factor). The rare word quadmester or quadrimester is occasionally used for either a three-term system or a four-term system.

An academic term (or simply "term") is a portion of an academic year, the time during which an educational institution holds classes. The schedules adopted vary widely. A trimester system divides the academic year into three terms which can be as short as eight weeks or as long as 16 weeks each. A quarter systems divides the academic year into four terms, up to 12 weeks each, and generally counts the summer as one of the terms. The word quadmester or quadrimester is occasionally used to mean either four months or (more commonly in modern American usage) a quarter of a year.

Keywords: Semester, Trimester, Quadrimester, Grade, CPI, SPI, CGPA, Class, Distinction, Pass, Fail, Marks sheet

### INTRODUCTION

**Academic Reflection:** A student is awarded a letter grade in each academic course he/she is registered for, including his/her overall performance in that course. There are nine letter grades: A, B, C, D, E, F, S, X and I. The correspondence between grades and points (on a 10-point scale)/rating is given below:-

A: 10, B: 8, C: 6, D: 4, E: 2, F: 0, S: Satisfactory, X: Unsatisfactory, I: Incomplete

If a student does not complete all the requirements for a course for a genuine reason, the instructor may award grade I (Incomplete). An I grade must be converted by the instructor to a regular letter grade by the last date for such conversion specified in the Academic Calendar, failing which it is automatically converted to an F grade.

A student getting an E or F grade in a course must either repeat it or substitute it by another course as suggested by DPGC (Departmental Post Graduate Committee). A

student getting a D grade in a course may be allowed to repeat it or substitute it by another course, provided:

- His/her CPI is less than the prescribed minimum and the student is allowed to continue in the programme as per provision in the Academic Performance Requirement and
- He/she has completed all the courses as prescribed by the department.

In case a course is repeated or substituted, the old grade will also appear on the transcript although it will not be taken into account while computing the CPI/SPI.<sup>[1]</sup>

Seminars will be graded as satisfactory (S) or unsatisfactory (X) and will carry zero units for credit. The grade S or X will be awarded for D.Litt., M.Tech., Ph.D. project/thesis units as follows:

- At the end of the semester, the project/thesis supervisor(s) will assess the student's progress towards the project/thesis work during the semester and will award the grade S for each set of 4 units if the work is

satisfactory and a X for every unsatisfactory 4 units. Thus a student registered for 16 units can get one of the following five combinations SSSS, SSSX, SXXX, XXXX.



Figure 1: Goal of Exam

If a student is on leave for a part of the semester or submits his/her thesis in the middle of a semester, the SPGC may reduce his/her thesis/project units appropriately.

Computation of the Semester Performance Index (SPI) and Cumulative Performance Index (CPI):-

The SPI is an indicator of the overall academic performance of a student in all the courses he/she has registered during a given semester. It is computed as follows: If the grades awarded to student are G1, G2, etc in courses with corresponding units U1, U2, etc, the SPI is given by :-

$$SPI = (U1G1 + U2G2 + \dots) / (U1 + U2 + \dots)$$

In the above computation, courses with S and X grades are ignored. Similarly, the CPI indicates the cumulative academic performance in all the courses taken including those taken in the current semester.

**Semester Performance Index:** The performance of a student in a semester is indicated by a number called Semester Performance Index, SPI. The SPI is the weighted average of the grade points obtained in all the courses registered by the student during the semester. For example, if a student passes five courses (Theory/labs./Projects/Seminar etc.) in a semester with credits C1, C2, C3, C4 and C5 and her/his grade points in these courses are g1, g2, g3, g4 and g5 respectively, then her/his SPI is equal to:

$$SPI = (C1*g1 + C2*g2 + C3*g3 + C4*g4 + C5*g5) / (C1 + C2 + C3 + C4 + C5)$$

The SPI is calculated to two decimal places. The SPI for any semester will take into consideration the FR grades awarded in that semester. For example if a student has failed in course 4, the SPI will then be computed as:

$$SPI = (C1*g1 + C2*g2 + C3*g3 + C4*zero + C5*g5) / (C1 + C2 + C3 + C4 + C5)$$

The courses which do not form the minimum requirement of the degrees will not be considered for

calculation of the SPI. Such additional courses undertaken and the grades earned by the student will be shown separately.

**Cumulative Performance Index:** An up to date assessment of the overall performance of a student from the time he/she entered the Institute is obtained by calculating a number called the Cumulative Performance Index, CPI, in a manner similar to the calculation of SPI. The CPI therefore considers all the courses registered by the student, towards the minimum requirement of the degree he/she has enrolled for, since he/she entered the Institute. The CPI is calculated at the end of every semester to two decimal places and is indicated in semester grade reports. The CPI will reflect the failed status in case of FR grade, till the course(s) is/are cleared. When the course(s) is/are cleared by obtaining a pass grade on subsequent registration(s) the CPI will only reflect the new grade and not the fail grades earned earlier.

**Grades:** The Institute follows a continuous evaluation system with considerable freedom being given to the course Instructor in deciding the pattern of evaluation. However, a typical theory course will have a mid-semester examination carrying 30 marks, one or two quizzes or mini tests carrying 20 marks and an end of semester examination carrying 50 marks. The total marks thus received is converted to a letter grade, based on the relative (and sometimes the absolute) performance of the student. The grades are on a scale of 10 with the grade AA being the best and FR being fails grades.



Figure 2: Reading vacation for exam

i. For every course taken by a student he/she is assigned a grade based on his/her combined performance over the semester in all the assessments in that course. These grades are described by the letters AP, AA, AB, BB, BC, CC, CD, DD, FR and DX, each of which not only indicates a qualitative assessment of the student's performance but

also carries a quantitative (numeric) equivalent called the grade point as given below:

ii. A student passes the course if he/she gets any grade in the range of AP to DD, but fails if he/she gets the grade FR or DX. The grade DR indicate 'course dropped'. However, minimum passing grade in each stage of dual degree project assessment shall be "CC". Grades like P (Passed), NP (Not Passed), Au (Audit Course) do not have any grade points associated with them. AP (Advanced Performer) is usually awarded to the top scorer of the batch.<sup>[2]</sup>

Letter Grade Point

Table 1: Grades/Points

Grade	Points	Grade	Points
AP	10	FR	0 (Fail: Repeat
AA	10	DX	Fail (Attendance shortage)
AB	9	II	Incomplete
BB	8	DR	Dropped
BC	7	PP	Passed
CC	6	NP	Not Passed
DD	4	AU	Audit

iii. FR grade will be awarded in cases where in the opinion of the instructor, the student hasn't had adequate academic exposure to the course and should therefore repeat the course. FR grade may also be awarded in cases of minor malpractice in examinations/assessments. A student, whose in-semester performance is very poor, may be awarded the 'FR' grade by the instructors, even if he/she had missed the end-semester examination due to any reasons.

iv. The grade **DX** in a course is awarded if a student does not maintain the attendance requirement in the Lecture/Tutorial classes. The DX grades may also be awarded to the students having bad or incomplete in-semester records on non-medical reasons. The DX grade will be declared in the first week of November for the Autumn Semester Courses and in the first week of April for Spring Semester Courses (in general one week before the semester end exams). **A student with DX grade in a given course is not permitted to take the semester-end examination in that course. He/She is also not eligible for 50% marks re-examination in that course. Such a student has to re-register for the same course whenever offered.**

v. In addition to the above grades, there is also an incomplete grade 'II' which is awarded in a lecture/lab course if a student has satisfactory in-semester performance, but has not appeared for the end-semester

examination on medical grounds. The student is entitled for 50 marks re-examination given at the end of the particular semester. 'II' grade will be converted into a performance grade (depending on the overall performance in the course) after the re-examination.

Re-examination due to illness or accident: If the student misses the examination due to personal illness or accident, his application for re-examination must be supported by proper medical certificate duly approved by the Medical Authority of the Institute. In the event of death or serious illness of parent or guardian, the application should be supported by adequate evidence of the same. The student should submit the medical certificate to the academic office. Any student who fails to apply for re-examination in the prescribed manner will be deemed to have failed in those courses and will be awarded FR grade. He/she will be required to repeat those courses.

Implications of fail grades on CPI: The CPI will reflect all courses done by the student including courses where he/she has failed. Thus, FR grade will affect the CPI and SPI of the student. In case of II grades CPI will be calculated on the basis of grade obtained by the student on successful attempt in the re-exam.

Fail and Incomplete Grades (Conversion rule):



Figure 3: Examination Hall

II Grade

Only students with a satisfactory and complete in-semester record, but who miss the end-semester exam for reasons set out as acceptable in rule of Re-examination due to illness or accident should be given an II grade. However, in case the student fails to appear for the re-examination also on admissible grounds, the student shall be considered to have dropped the course. If the reason for absence at the re-exam is not supported by a medical certificate, the II grade awarded will be revised to FR.<sup>[3]</sup>

Thus, the II grade gets converted to one of the following: (i) 'DR' (course dropped, as above) (ii) 'FR' in case of poor performance or unjustified absence, for the re-exam (iii)

A pass grade depending on the student's performance. The II grade will therefore not be continued beyond the semester-end re-examinations. DX Given to students with attendance shortage. This does not count in the SPI/CPI. However it will be counted as a backlog.

FR grades:

i. In-semester performance of all students should be displayed and sent to the academic office by the instructor before the end-semester examination. Those awarded 'DX' grades as described above will be clearly identified in this list as per academic calendar.

ii. Based on the in-semester performance, the instructor also decides and publishes a cut-off (based on the average performance of the class), above which the in-sem performance is considered 'Satisfactory'. (This limit would be similar to the lower limit for the DD grade).

iii. A student with a 'Satisfactory' in-semester performance should not be given an 'FR' grade in the overall assessment. Such a student, in the event of overall poor performance (not passing), should be given an 'FF' grade and a chance at re-examination. The maximum grade obtainable in such re-examination is limited to DD. It is thus clarified that grades FF and II are place-holders only and do not enter into CPI/SPI calculations directly. These grades get converted to one of the regular grades after the semester-end re-examinations. However FR and DX grades are given for different reasons, and have direct consequences on SPI/CPI.

**Academic grading in India** is based on a percentage system. Generally, at the school level percentages of 80-90 are considered excellent while above 90 is exceptional. At the university level however percentages between 69-79 are considered excellent and are quite difficult to obtain. The direct comparison of the percentage of marks obtained at one university with that at another is difficult. Indeed, the differential between universities in terms of marking scale can be as much as 20%, with some requiring an 85% plus for the award of Distinction, an approximate equivalent of the Latin honor summa-cum-laude, while yet others would award Distinction at above of 70%.

In some instances, a score close to 90% is very rare and is virtually impossible. Much of this can be reconciled in the backdrop of the minimum pass score. In a university with a 90% plus for Distinction, 60% may be the minimum passing mark. The university awarding distinction at 70% may have a passing mark of 45%. Thus the comparison of

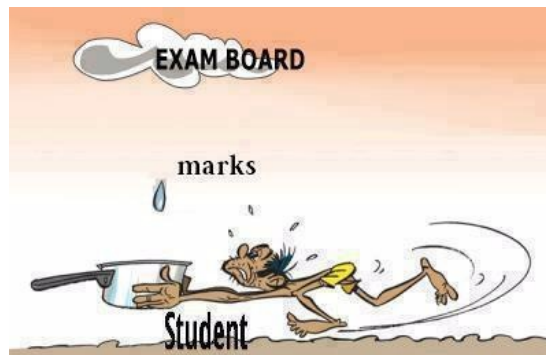


Figure 4: Hard truth!

GPA is quite difficult for Indian students elsewhere. A student having 95% will be close to 3.9 on the GPA scale, as would a student with a 75% from a 70% cut-off-for-distinction institution.

University of Mumbai is one such example of a tough scoring system where a 40% is required for passing while 70% is the required cut-off for Distinction. The University of Delhi and affiliated institutions are another example of this type of marking which give distinction above 75%. Most old Indian government universities have a yardstick of 75% as their distinction cutoff. For such a university, the measure of a student's performance can be done against the rest of the class in the university. The best yardstick seems to be, apart from the base passing mark, the very classification of the awarding university as to where a given range would fall (distinction, first class, second, or fail). Attempts are being made to move to a GPA-based system by most modern universities, but older ones tend to continue to rely on the percentage of marks.

**GPA:** In India, many universities and institutes rank their students in percentage of marks they get from the examinations and credits. Many universities have their ranking on point system. Though there are exceptions to standard system such as MBA Courses, the following table will summarize the grading system and conversions for normal graduation and post graduation in universities and institutes, unless otherwise declared by the institute.

- \*\* Some institutes with difficult curriculum and tough scoring give 70% scoring as Distinction
- \*\* Some universities have different CPI system of evaluating B.Tech. degree students. They have and give First Division at 60% Marks and Distinction/Honors at 75%.

## Grading

Table 2: Percentage/Grade

Percentage	Classification/ Division	U.S. Grade Equivalent	Point	U.S. Grade Equivalent
70% and above	Distinction / Outstanding	4.0		A+
60% and above but below 70%	First class	3.5 - 3.99		A
50% and above but below 60%	Second Class	2.5 - 3.49		B+/B
40% and above but below 50%	Pass Class	1.5 - 2.49		C+/C
Below 40%	Fail	0 - 1.49		F

The 7 point GPA introduced by University of Mumbai from Academic year 2011 - 2012 is categorized as follows:

Table 3: Marks/Grade

Letter Grade	Marks	Grade Point
O	80 and above	10
A	75 to 79.99	9
B	70 to 74.99	8
C	60 to 69.99	7
D	50 to 59.99	6
E	45 to 49.99	5
P	40 to 44.99	4
F (Fail)	39.99 and below	0

The Indian Institutes of Technology are under control of the Government of India and therefore have strict rules for grades. Depending on the course the evaluation is based on participation in class, attendance, quiz, exam and/or paper. Continuous evaluation is done by course instructors. For instance, the evaluation system of IIT Madras is the Cumulative Grade Point Average with a scale from 0 to 10 which is converted to letters as follows:

Table 4: Grades/Points

Letter Grade	Grade Points	in Words
S	10	Excellent (top students)
A	9	Very Good
B	8	Good
C	7	Satisfactory Work
D	6	Sufficient (passed)
E	4	Poor (but passed)
W	0	Insufficient attendance (below 85%)
U	0	Failed, or use of unfair means

CGPA then gets calculated as the cumulative credit-weighted average of the grade points:  $CGPA = (\sum C_i \cdot GP_i) / (\sum C_i)$  where: N is the number of courses  $C_i$  is credits for the  $i^{th}$  course  $GP_i$  is grade points for the  $i^{th}$  course CGPA is the cumulative grade point average. Cumulative Grade Point Average (CGPA) would also be reflected in the Grade card so there is no need to calculate it. However, you can use the following formula to calculate overall CGPA:

CGPA = sum of Grade points (main 5 subjects) divided by 5.

for example:  $9+9+10+10+9/5 = 47/5=9.4$  (CGPA)

To calculate percentage from CGPA, simply multiply it with 9.5 such as:

CGPA=9.4, overall percentage is :  $9.4 \times 9.5 = 89.3\%$  Marks.

The CGPA is not the same as the American one. In India some credits might be awarded during Bachelor studies for Co-curricular and Extra-curricular Activities, while during the Masters Programme this is not allowed. Through agreements with numerous international

organizations, IIT grades are accepted from many international organizations outside India, like NTU, NUS and DAAD.<sup>[4]</sup>

International Grade Conversion by World Education Services for Percentages scored in Indian Universities.

n | - | 35\*-42 | 1.5 - 2.14 | C | Fail/Third Division | - | 0-34 | 0 - 1.49 |

Here is list of advantages of grading system in schools:

- 1) It considerably reduces inter and intra examiner's variability in marking.
- 2) It also takes care of imperfection of tools used for assessment.
- 3) The fear of examination is not there in the minds of students.
- 4) The suicide rate had decreased due to the introduction of grade system.

Disadvantages of grading system in schools:

- 1) It is quite discouraging for the meritorious students.
- 2) It defeats the whole concept of studying hard and getting good marks.



Figure-5: Result

Advantages:- Students feel less stress with grading system. Some students work hard for whole the year but can't do better at the exam time grading system is very helpful for those students. The evaluation system will consist of a component of internal evaluation by the Department as well as final semester end examination conducted by the University. The former will carry a 20% weight and later 80% weight towards the total marks obtained by the student in a given subject. After adding the internal marks (maximum 20 %) with the marks secured by the student in the university examination (maximum 80%), the % marks will be covered to letter grade as per the following:

Student failing in examinations may take Remedial University Examination to be held during mid semester exam slots. At any point of time student can have

maximum 2 backlogs/FF grade pending. The performance of a student during semester is indicated in grade card by "Semester Performance Index" or SPI, Which is calculated as follows: Each letter grade (AA to FF) will have a corresponding grade point assigned as follow: AA = 10 AB = 9 BB = 8 BC = 7 CC = 6 DD = 5 FF = 0 If  $C(i)$  is the credit of course I and the grade point secured by the student is  $G(i)$  in that course, the SPI is given by the formula  $n \text{ SPI} = \sum C_i G_i / \sum C_i$   $i=1$   $i=1$  Where the sum is overall the 'n' courses taken during a semester. In the same way, the cumulative performance of the student is indicated by "Cumulative Performance Index (CPI)" which is calculated essentially by the same formula but the sum being over all the courses taken in the current semester as well as in the preceding semesters.

Table 5: Grade/Range

Grade	% range
AA	85%-100 % marks
AB	75%-84% marks
BB	65%-74% marks
BC	55%-64% marks
CC	45%-54% marks
DD	40%-44% marks
FF	Less than 40%

However, in calculating the CPI, any fail grade which the student might have earned but has subsequently passed will be replaced by the passing grade in that subject. The SPI of the corresponding semester will be recalculated by replacing FF grade to new earned grade and calculating the new SPI of the corresponding semester will, however, continue to reflect such failures and will clearly reflect the old grade point in bracket and new earned grade without bracket and also reflect in written too in scorecard of corresponding semester. Class and Distinction etc. will be awarded for the degree on the basis of % calculated from cumulative performance index (CPI).<sup>[5]</sup>

Formula for Calculating % from the cumulative performance index CPI:

Formula for % Calculation =  $CPI \times 5 + 30$

Disadvantage:- Students that have gain position in the class they couldn't find the point to point difference as this system work approximate % age.

Other than this:-

Advantages:

1. More students take rigorous courses.
2. More challenging courses can be offered.
3. It increases a student's GPA.
4. Higher class rankings for those who take more demanding courses.
5. Students are more competitive with peers from other schools with weighted grading for first-choice and more elite college acceptance.
6. Better chance for students to receive more in scholarship monies.
7. More likelihood for students to have higher self-esteem

Table 6: Percentage/Result

Sr. No.	Percentage %	Result
Class 1	> 40% to < 48%	Pass
Class 2	> 48% to < 60%	Second
Class 3	> 60% to < 70%	First
Class 4	> 70%	Distinction

Disadvantages:

1. Lack of consistency from school to school as to what courses are weighted and how much they are weighted.
2. Not all courses, even honors and AP, are equally demanding.
3. It may send a message to those who are taking regular courses, that their work is not as highly valued as weighted classes, which may lower self-esteem and attempts to strive for high grades.
4. College admissions offices tend to look at the overall GPA and not if the grades had been weighted.
5. If a student is afraid of getting a low grade in a more rigorous course, he/she may opt to take a less demanding course in order to earn a higher grade.
6. Tracking of students could become more common.

7. Students at the lower academic end of the spectrum would not have equal opportunities to take a more engaging academic program.

8. Litigation by parents may occur if they believe the system is hindering their child (ren) from equal access to the curriculum.

9. Smaller schools have fewer opportunities to offer a wide array of weighted and non-weighted courses.

CPI/CGPA to Percentage Converter

Formula for conversation of the equivalent of CPI/CGPA For university student find CPI/CGPA equivalent to the percentage. The formula is given below.

Percentage Marks =  $(CPI/CGPA - 0.5) * 10$

CPI/CGPA The class should be given by below ratio.

Table 7: CPI/Class

Below 5.5	Pass Class
5.5 & Above	Second Class
6.5 & Above	First Class
7.1 & Above	First Class With Distinction

#### Award of Degree

For all Courses, where the duration of the course is two years, students may find them Percentage on the basis of the CPI Cumulative Performance Index). If the course Duration is three or more than three they may find the percentage on the basis Of the CGPA (Cumulative Grade Point Average). All the GTU Student calculates CPI/CGPA to percentage in online using the given calculator.<sup>[6]</sup>

**Overview:** In elementary and high schools, the school year is usually from June to March, while in Universities it is from July to May. There is a mid-year break during summer, usually from the end of May to the start of July in Universities and in elementary and high schools, the vacations range from the beginning of May and lasts up to the end of June. There is also a winter vacation of two weeks at the beginning of the year. However, in the Eastern and southern states like West Bengal and Karnataka there will be two breaks, one for Dasara in September/October for 15 days and another for Christmas in December which ranges from 7 to 15 days. A semester system is being implemented in most of the Universities in India as directed by the University Grants Commission. Delhi University also introduced this system. For Indian administered Kashmir, the school year usually

begins in mid-October or the start of November. There are two vacations in a year; winter holidays last from the start of December till the first of March. A summer vacation usually lasts two weeks from mid-July to the end of July, the dates do vary. For schools, students move from old to the new academic year immediately after the exams for the previous year is over with a small break of a week for compilation of results. Most schools also have an autumn break or Diwali break in August or around October/November. This is generally right before the second semester exam in September or in the middle of the second semester.

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