

# Trends in Grade Distributions at Hilbert College: Report to the Provost's Council

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This report is a follow-up to an earlier brief report contained in an email to members of the Provost's Council (2/20/2013) in which the distribution of letter grades was examined across fall terms for 2002, and 2009-2012. That report showed an apparent trend toward higher percentages of A grades in recent fall terms, a relatively steady distribution of B and D grades, a declining percentage of C's, and a very recent decline in F's since fall of 2010.

The present report is intended to expand on those earlier analyses by including grade distributions from both fall and spring terms over the years 2009 through 2012. This represents 4 fall terms and 4 spring terms during which a total of 35,629 letter grades (A – F) were awarded in 915 courses, many of which had multiple sections and most were run more than once. For the purposes of this report, grades of W, I, P, S, U, and AU were excluded. Data was obtained from student records databases accessed through PowerCampus. The database titled "transcriptdetail" was a primary source for the data used in this report.

Five primary questions were addressed in the analyses:

1. Have grade distributions at Hilbert College changed over the period from spring of 2009 through fall of 2012?
2. Does the distribution of grades vary by course level; i.e., lower-level (100s-200s) versus upper-level (300s-400s)?
3. Does the grade distribution vary by course prefix?
4. What individual courses have the highest and lowest percentages of A grades and highest percentage of F grades?
5. Do grade distributions vary by type of course (e.g., traditional versus distance learning)

## Results

**1. Trends in Grade Distribution Over Time.** Figure 1 below shows the distribution of letter grades aggregated across all 8 semesters from spring of 2009 through fall of 2012.

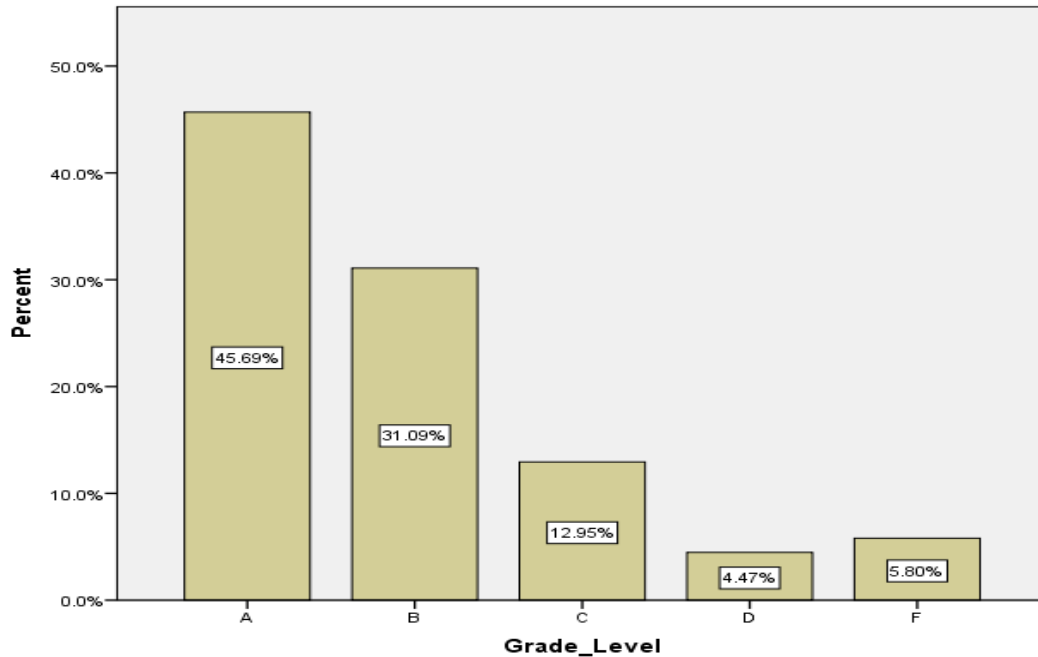


Figure 1. Aggregated letter grade distribution, spring 2009 through fall 2012

As noted in the earlier report, this distribution appears to be consistent with national data as reported in Rojstaczer & Healy (2012) who looked at grade distributions historically for the period 1940 to 2008 and found that in 2008 about 43% of all letter grades awarded were A's and that grade inflation was historically more evident at private institutions than at public colleges and universities.

Figure 2 shows the grade distribution trend lines across semester and year. Note that while the percentage of A's awarded has trended upward over this period, typically a higher percent of A's are awarded in spring semester courses than in fall semesters. A similar but reversed pattern appears to hold for F grades with more being awarded in fall than in spring semesters.

## Grade Distribution Report

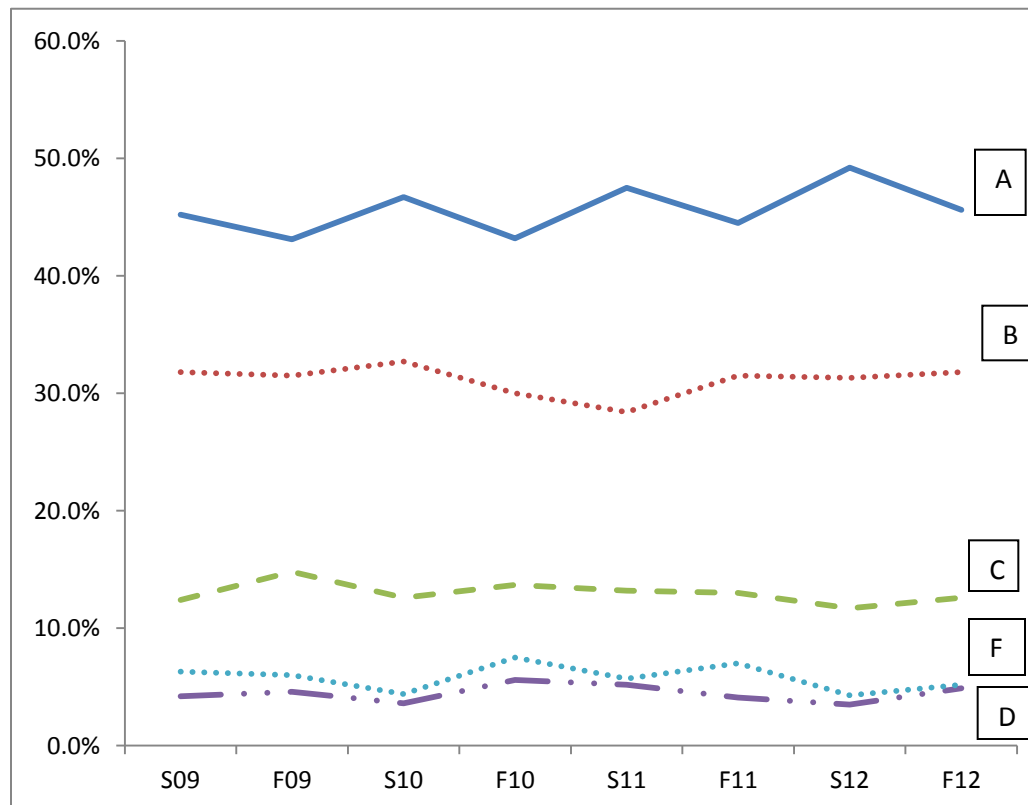


Figure 2. Letter grade distributions by academic year and semester, spring 2009 – fall 2012

The grade point average of all students in spring semesters was 3.09 while in fall semesters it was 2.99, a difference that is statistically significant at the  $p < .001$  level,  $t = 7.88$  (35339.4).

The trend of increasing grade point averages across years is also statistically significant,  $F = 13.69$  (3, 35625),  $p < .001$ .

**2. Grade Distribution by Course Level.** Figure 3 below shows the distribution of letter grades cumulatively by course level (100 – 400). This shows that A's and B's are more frequent in Upper Division courses (300s & 400s) while C's, D's and F's tend to be more common in Lower Division courses (100s & 200s). The mean grade point average of Upper Division courses ( $\bar{x} = 3.17$ ) is significantly higher than the mean grade point average in Lower Division courses ( $\bar{x} = 2.95$ ),  $t = 19.13$  (33132.8),  $p < .001$ .

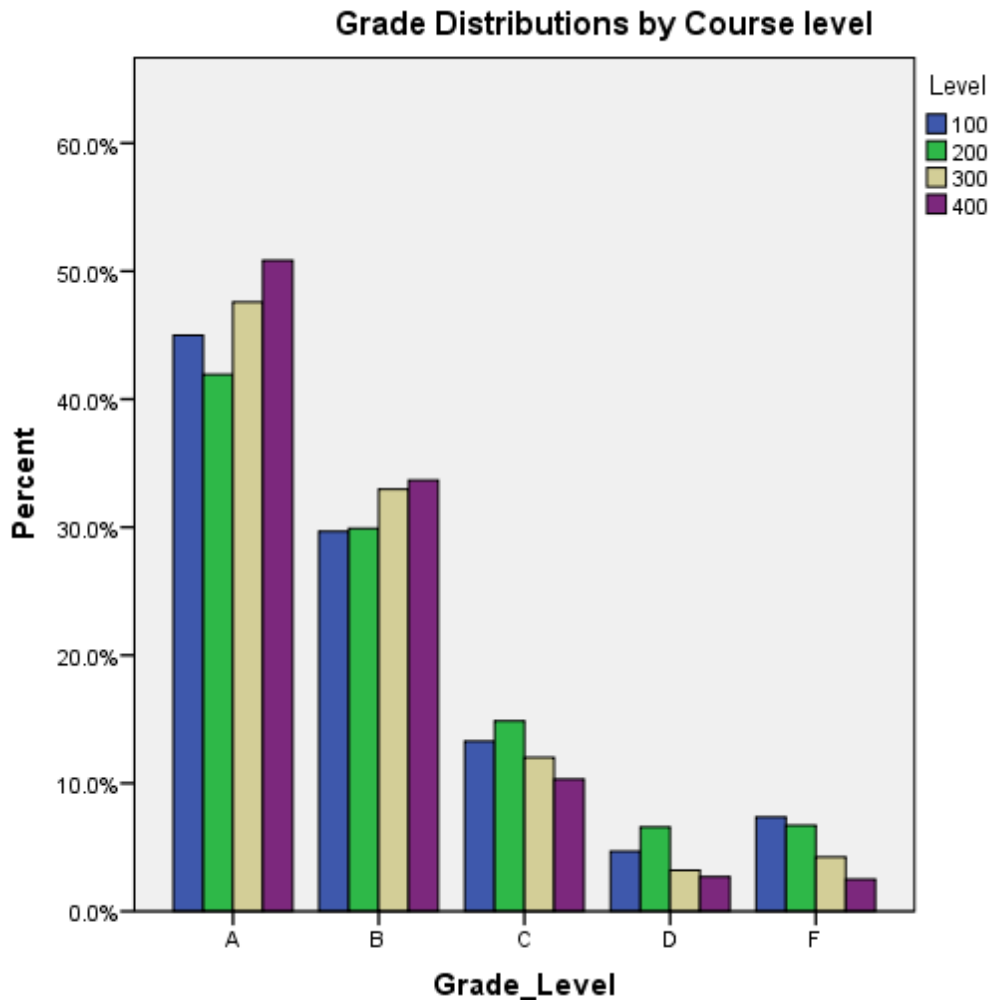


Figure 3. Grade distribution by course level

This pattern of a greater proportion of D's and F's in 100 and 200 level courses and a higher proportion of A's and B's in 300 and 400 level courses is not all that surprising and conforms with a traditional viewpoint that introductory and first year courses serve as filters on the student population. Those students who struggle at these early levels are not likely to progress to 300 and 400 level courses. So, the academic performance in upper level courses is expected to be higher.

A two-way ANOVA on grade point averages with year and upper vs. lower division as factors showed a significant main effects of year on grades,  $F(3, 35621) = 8.21, p < .001$  and of Upper vs. Lower Division on grades,  $F(1, 35621) = 416.37, p < .001$ . In addition there was a significant interaction effect between year and division on the grade averages,  $F(3, 35621) = 11.391, p < .001$ . As seen in Figure 4 the difference between Upper and Lower Division grade averages varied by year. Specifically, in the final two years, 21011 and 2012, while the Upper Division grade average had dipped from previous years, the grade average for Lower Division courses showed a more dramatic increase.

## Grade Distribution Report

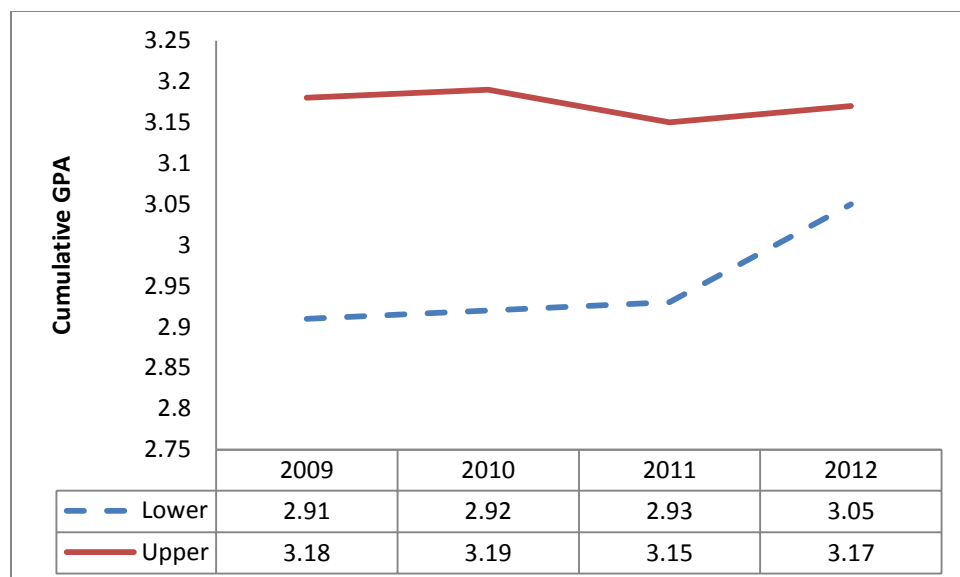


Figure 5. Grade averages by Year and Division

**3. Grade distribution by course prefix.** Course prefixes denote the academic discipline or department within which a course is taught. Do grade distributions vary by course prefix? To examine this question a crosstabulation was conducted of the frequency of letter grades (A – F) by the 42 course prefixes used during the period 2009 through 2012. There was a significant association between the course prefix and final grade,  $\chi^2(164) = 2653.26, p < .001$ . Table A. showing the distribution of letter grades by course prefix is presented as an appendix to this report.

**4. Grade Distributions by Individual Courses.** The grade distributions by individual course were examined to identify those courses with either above or below expected percentages of A's and above expected percentages of F letter grades. In a sense this is a way of identifying courses which students might describe as "easy A's," those courses that are the "toughest A's," and those courses that students are most likely to fail. All grades across the 8 semesters, 2009 – 2012, were included for each course. No attempt was made to separate different sections of a course or to look at grade patterns for individual instructors. Only courses which had an accumulated total enrollment of 20 or more were examined. This was done to eliminate courses such as independent studies or small seminars in a particular discipline that might have a small select number of students and for which a distribution of grades would not be expected to cover the full range from F to A. Finally, courses were identified as having a larger than expected proportion of A grades if 75% or more of grades awarded were A or A- (see Table 2). Courses having the lowest proportion of A's were those in which 25% or less of the grades awarded were A or A- (Table 3). Course identified as having a high proportion of F grades were those with 10% or more F's (Table 4). Table B. in the appendix shows the complete distribution of letter grades by course prefixes. In each of these tables courses are listed alphabetically by prefix and level.

In Table 1 for courses with above average percentages of A grades, it is noted that a majority of these courses are upper division (300 and 400 level). This is consistent with the earlier finding that upper division courses tend to award more A's than lower division courses and with the notion that students who progress to upper level courses in their majors are expected to be able to achieve at higher levels than does who do not.

## Grade Distribution Report

Table 1. Courses with  $\geq 20$  enrollments and  $\geq 75\%$  of A grades

<b>Course ID</b>	<b>Percent of 'A' Grades</b>	<b>Total Number of Enrollments</b>
<i>AHI 103</i>	80.4%	168
<i>BUS 400</i>	75.0%	24
<i>CJ 499</i>	93.0%	100
<i>COM 210</i>	84.2%	57
<i>COM 261</i>	84.0%	25
<i>COM 310</i>	83.3%	42
<i>COM 320</i>	83.9%	31
<i>COM 344</i>	94.1%	34
<i>COM 348</i>	92.1%	38
<i>COM 351</i>	89.5%	38
<i>ECI 450</i>	78.3%	46
<i>FS 499</i>	100.0%	50
<i>HI 215</i>	79.8%	198
<i>HON 105</i>	90.3%	62
<i>HON 305</i>	96.2%	26
<i>HON 330</i>	100.0%	20
<i>HS 330</i>	88.1%	42
<i>HS 460</i>	83.3%	54
<i>HS 461</i>	84.0%	50
<i>LIB 101</i>	82.8%	29
<i>LW 103</i>	77.5%	89
<i>LW 312</i>	84.8%	33
<i>LW 330</i>	94.3%	35
<i>LW 401</i>	87.1%	31
<i>LW 403</i>	76.9%	26
<i>PH 330</i>	75.4%	69
<i>RH 204</i>	78.6%	28
<i>RH 303</i>	79.2%	24
<b>ALL COURSES</b>	45.7%	35,629

Table 2 shows the courses with the lowest percentages of A's awarded. Here we see a mix of levels with some being 100 level introductory courses and others at 300 and 400 levels. Some courses on this list might be considered gateway courses in a major intended to separate those students who show the ability to proceed and succeed in the program from those who should consider alternative programs of study.

## Grade Distribution Report

Table 2. Courses with  $\geq 20$  enrollments and  $\leq 25\%$  of A grades

<b>Course ID</b>	<b>Percent of 'A' Grades</b>	<b>Total Number of Enrollments</b>
<i>ACC 205</i>	19.3%	192
<i>ACC 313</i>	20.0%	25
<i>ACC 410</i>	17.9%	39
<i>ACC 420</i>	22.4%	49
<i>BI 101</i>	24.0%	196
<i>BI 112</i>	24.5%	139
<i>CJ 101</i>	24.9%	598
<i>CJ 305</i>	24.3%	478
<i>COM 270</i>	25.0%	20
<i>HI 212</i>	20.7%	82
<i>HS 215</i>	21.3%	75
<i>PS 402</i>	24.5%	886
<i>PSY 215</i>	14.0%	50
<i>PSY 240</i>	24.4%	45
<i>PSY 312</i>	6.8%	44
<i>PSY 322</i>	21.4%	38
<i>PSY 342</i>	10.3%	29
<i>PSY 412</i>	24.4%	45
<i>SO 201</i>	21.1%	71
<i>SO 101</i>	19.8%	172
<b>ALL COURSES</b>	45.7%	35,629

Table 3 displays courses with 20 more enrollments between spring of 2009 and fall of 2012 in which 10% or more of the final grades were an F. Earlier we saw that the overall percent of F grades in the population was 5.8%.

Table 3. Courses with  $\geq 20$  enrollments and  $\geq 10\%$  of F grades

<b>Course ID</b>	<b>Percent of 'F' Grades</b>	<b>Total Number of Enrollments</b>
<i>ACC 205</i>	17.7%	192
<i>CJ 207</i>	14.8%	81
<i>COM 207</i>	10.0%	20
<i>EN 100</i>	21.5%	172
<i>EN 215</i>	12.5%	24
<i>EN 315</i>	12.8%	39
<i>EN 333</i>	12.5%	40
<i>HI 104</i>	16.3%	135
<i>HI 207</i>	12.2%	41
<i>HI 213</i>	10.5%	38
<i>LW 402</i>	12.9%	31
<i>MA 100</i>	15.2%	256
<i>MA 135</i>	11.5%	78
<i>MA 145</i>	17.5%	445

## Grade Distribution Report

<i>MA 200</i>	10.9%	850
<i>PH 205</i>	21.9%	32
<i>PS 101</i>	18.9%	106
<i>PSY 101</i>	12.4%	644
<i>PSY 215</i>	10.0%	50
<i>RS 202</i>	14.8%	27
<i>SO 101</i>	11.3%	795
<i>SO 201</i>	12.7%	71
<i>SP 101</i>	10.4%	1284*
<b>All Courses</b>	5.8%	35,629

\* SP 101 enrollment includes students who are taking this course while still in high school.

Some of the same courses appear in both Table 2 ( $\leq 25\%$  A's) and Table 3 ( $\geq 10\%$  F's). No course appearing in Table 1 ( $\geq 75\%$  A's) also is present in either of the other two tables.

**5. Grade Distributions by Type of Course.** Finally, grade distributions were examined by course types. Course types vary in being either traditional lecture, distance learning, hybrid, internship, independent study or seminar. The breakdown of course types is displayed in Table 4. Seminar courses represented only 2 enrollments over the period of this study and were omitted from further analyses.

Table 4. Enrollments, average GPA, and percent A and F grades by course type

<b>Course Type</b>	<b>Number Enrollments</b>	<b>Percent</b>	<b>Average Grade (0-4)</b>	<b>Percent A's</b>	<b>Percent F's</b>
<i>Traditional/Lecture</i>	33528	94.1%	3.03	45.7%	5.6%
<i>Distance Learning</i>	1091	3.1%	2.90	46.2%	12.9%
<i>Hybrid</i>	585	1.6%	3.14	50.3%	5.1%
<i>Internship</i>	323	0.9%	3.84	45.1%	0.6%
<i>Independent Study</i>	100	0.3%	3.65	76.0%	2.0%
<i>Seminar*</i>	2	< .01%	N/A	N/A	N/A
<b>Total</b>	35629	100%	3.04	45.7%	5.8%

An ANOVA test showed that grade averages differed significantly by course type,  $F = 56.07$  (4, 35622),  $p < .001$ . The mean grade average for the traditional/lecture type courses was similar to that of the hybrid courses, but was significantly different from all other types. Specifically, the mean grade average compared to that of the traditional/lecture courses was lower in distance learning courses and higher in internship and independent study courses



## Conclusions

In regard to the five questions posed by this study:

1. Have grade distributions at Hilbert College changed over the period from spring of 2009 through fall of 2012?  
Yes. There has been a statistically significant increase in mean grades from 2009 through 2012. Much of that increase appears to a gradual but steady increase in the percentage of A grades awarded along with a corresponding decline in the percent of C grades. Typically a higher percentage of A grades are awarded in spring semester courses than in fall courses, while F grades tend to be somewhat more common in fall semesters than in spring semesters. Grade averages across all courses are higher in the spring than fall semesters.
2. Does the distribution of grades vary by course level; i.e., lower-level (100s-200s) versus upper-level (300s-400s)?  
Yes. The mean grade in Upper division (300 & 400) courses is significantly higher than for Lower division (100 & 200) courses. A and B grades are more common in Upper division courses while C, D and F grades are more frequent in Lower division courses. There was significant interaction effect in looking at the relationship of grade averages across division and years, with grade averages declining slightly from 2009-2010 to 2011-2012 for Upper division courses while grade averages for Lower division courses have shown a more dramatic increase across the same periods.
3. Does the grade distribution vary by course prefix?  
Yes. There is a significant association of grades by course prefix, suggesting that grading practices and distributions likely vary across different disciplines and departments.
4. What individual courses have the highest and lowest percentages of A grades and highest percentage of F grades?  
Tables within this section of the report show which individual courses tend to award higher than average percentages of A's, lower than average percentages of A's, and higher than average percentages of F's.
5. Do grade distributions vary by type of course (e.g., traditional versus distance learning)?  
Yes. While the grade distributions of traditional/lecture and hybrid types of course are relatively similar, they are different from other types. Compared to traditional/lecture courses, distance learning courses have a lower grade average while internships and independent studies have higher grade averages.

**References.**

*Rojstaczer, S & Healy, C. (2012). Where A is ordinary: The evolution of American college and university grading, 1940–2009. Teachers College Record, 114 (7), p. 1-23.*

<http://www.tcrecord.org> ID Number: 16473, Date Accessed: 3/6/2013 9:55:10 AM