

## Repeat Courses

This report considers the scope and consequences of course repeating – the practice of taking the same course multiple times. Students repeat courses for diverse reasons. Some courses, e.g., BAND, EPICS, PES and various seminar courses, are meant to be repeated. For non-repeatable academic courses, students repeat to improve a low grade or to better master the course material before moving on in their curriculum. Our findings show that repeating courses usually leads to an improved course grade, but that the improvements are often minimal. Retaking courses, if done often, can diminish the likelihood the student will graduate on time.

### University Rules Governing Repeats

Rules governing when students may or may not retake a course are mostly set by the University, but in some instances vary by college and program. The rules define “non-repeatable” courses as those which do not result in duplication of credit. Most academic courses are non-repeatable. In contrast, “repeatable” courses include those which can be taken many times. Repeatable courses include internships, as well as BAND, PES, and EPICS courses. In general, a non-repeatable course can be repeated up to **three** times [under the guidance of an academic advisor](#). Some programs have additional rules, such as in [Mechanical Engineering](#), where students may retake an ME course after earning a C- or lower, but may not retake if a C or better was earned the first time. When a student repeats a course, the first course outcome is excluded from their transcript and GPA and the subsequent course outcome, whether it is better or worse, becomes the grade of record. In spring 2017, 92% of undergraduate grades were awarded for non-repeatable courses.

### How Much Repeat Activity?

There are two ways of defining repeated courses and two ways of totaling the amount of repeat activity occurring at Purdue. The primary method is to count only courses that are marked in the institutional data as an excluded course or marked as an included repeat course. An alternative method is to count all instances when a student’s record shows multiple outcomes for the same course. The second method includes both repeatable and non-repeatable courses

By either method, the tally of repeated courses accumulates over time. Students’ decision to exclude an earlier course can be made at any time until graduation, and often is made more than a year after the first attempt was completed. As semesters go by, the number of repeated courses in a given semester increases since students may retake a course at any time. For spring 2016, there were 3,462 excludes and 8,493 includes. Three years earlier, in spring 2013, there were 5,726 excludes and 9,928 includes. When the alternative method is used the number of repeated courses in spring 2013 was slightly lower at approximately 14,000 courses.

Figure 1: How Much Repeat Activity?

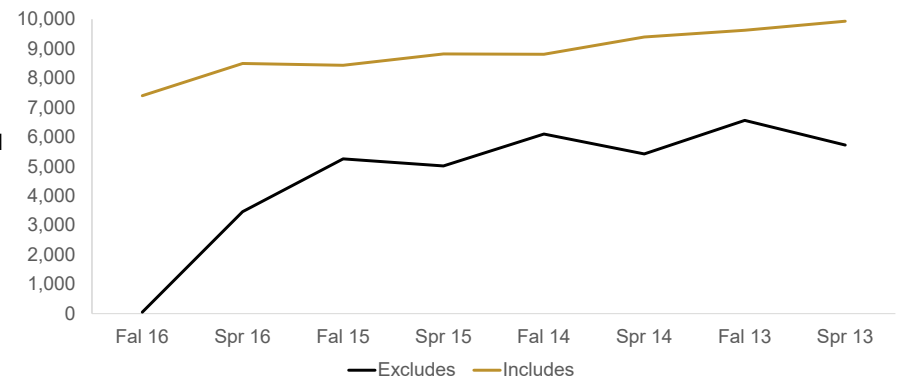


Table 1: Top Ten Courses

Courses with the Largest Number of Repeats				
Course ID	Course Name	Total	Repeat Count	Repeat PCT
COM11400	Fundament Of Speech	15,885	2,259	14.2%
ENGL10600	First-Year Composition	14,911	1,951	13.1%
PSY12000	Elementary Psychology	9,937	2,021	20.3%
SOC10000	Intro Sociology	8,904	1,382	15.5%
CHM11500	General Chemistry	8,613	1,238	14.4%
ECON25100	Microeconomics	8,020	2,149	26.8%
PHYS17200	Modern Mechanics	7,215	1,564	21.7%
MA26100	Multivariate Calculus	7,003	1,529	21.8%
MA15300	Algebra And Trig I	5,689	1,657	29.1%
MA16200	PI Anly Geo Calc II	5,473	1,698	31.0%

Courses with the Highest Rate of Repeats				
Course ID	Course Name	Total	Repeat Count	Repeat PCT
<i>BAND11000</i>	<i>Marching Band</i>	<i>1,108</i>	<i>1,027</i>	<i>92.7%</i>
<i>ENGR19500</i>	<i>16 different course titles</i>	<i>1,392</i>	<i>1,177</i>	<i>84.6%</i>
<i>PES11400</i>	<i>8 different titles</i>	<i>2,204</i>	<i>1,628</i>	<i>73.9%</i>
<i>MGMT49000</i>	<i>102 different course titles</i>	<i>1,045</i>	<i>726</i>	<i>69.5%</i>
<i>ME29700</i>	<i>64 different titles</i>	<i>1,271</i>	<i>870</i>	<i>68.5%</i>
ECE20200	Linear Circuit Anly II	1,312	646	49.2%
ECE27000	Intro Digitl Sys Desgn	1,249	542	43.4%
MA16100	PI Anly Geo Calc I	4,982	1,946	39.1%
STAT22500	Intro Probability Mdl	2,256	830	36.8%
ME20000	Thermodynamics I	3,633	1,291	35.5%

Note: Italics indicates a repeatable course.

Repeats after A or B are much less common – amounting to only 2.5% and 0.8% of all A and B grades earned respectively. Nearly all of the 7,534 repeats after an A occurred in repeatable courses. Because repeatable courses give relative fewer grades lower than A, and because students are nearly always content with a B, only 1,832 repeats after B were found.

The causes and consequences of course repeats is most interesting following an initial C or D. Credits are awarded after these grades are earned, though some majors and academic departments do not allow students to progress in the major if the student passed with a D grade. With either C or D, the course material may not have been fully mastered. Students may choose to retake in hopes of earning a higher grade (and boosting their cumulative GPA), or in order to learn the material more fully.

Some courses are repeated more than others. In a dataset containing all course records (N = 793,064) for students beginning in Fall 2010, Fall 2011 and Fall 2012, the most repeated course by total student count was COM11400 (Fundamentals of Speech). This is the highest-enrollment course at Purdue, and 14.2% of students who took COM11400 repeated it. In terms of rate of repeat, the highest course is BAND11000 (Marching Band, a repeatable course). Ninety-three percent of BAND11000 students repeat it.

### When Do Students Repeat?

The likelihood that students will repeat a course is influenced most strongly by the grade received in the first attempt. Not surprisingly, the highest incidence of course repeats happens after a failing or withdrawn grade in the first attempt. After a grade of F or W, students retake the course 38.3% of the time – amounting to 16,315

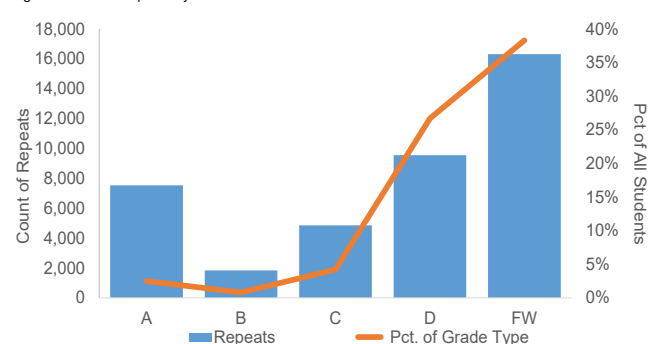
retakes in the

three-year

cohort under

study here.

Figure 2: Course Repeats by Grade



# Repeat Courses

## Consequences

Students who repeat a course have a high probability of earning a higher course grade the second time. Students who repeated after a failing or withdrawn (F or W) grade passed the course in 77% of their second attempts. Overall, an improved grade was earned in 66% of repeats and a worse grade in about 11%.

The table shows the distribution of differences between a student's first and second attempt at courses. In the first column, for example, 86% of students got an A in both their first and second attempt, and in 10% of cases fell from A to B. After an initial F or W, only 23% of students failed twice. Twelve percent earned an A the second time, 22% earned a B and 28% earned a C.

However, the effect of an improved grade on students' cumulative GPA is often negligible. Consider the case of a junior student with classification = 05. The student would have accumulated at least 60 credits and, assuming a B average, 180 quality points. By retaking and improving any course to an A, the student improves his or her total to 183 quality points and his or her cumulative GPA from 3.00 to 3.05.

Table 2: Distribution of Differences Between First and Second Attempt

		First Attempt				
		A	B	C	D	FW
Second Attempt	A	86%	44%	28%	10%	12%
	B	10%	39%	41%	30%	22%
	C	1%	10%	21%	37%	28%
	D	0%	2%	4%	13%	16%
	FW	2%	5%	6%	10%	23%

### Academic Outcomes for PHYS17200, after initial C & D grades

	Count	Grade value	Grad GPA	4yr Grad	5 yr Grad	4-yr sig.	5-yr sig.
Moved on after C	1,419	2.07	2.91	33%	61%		
Repeated after C	113	2.39	2.89	26%	50%	0.036	0.009
Moved on after D	280	1.10	2.80	23%	44%		
Repeated after D	263	1.65	2.75	13%	39%	0.000	0.034

These results suggest students' chances for success are higher if they do not repeat PHYS17200 after a C or D. The evidence pertains to this course across all majors. When we assessed the effect among First Year Engineering majors specifically, we found the same result as the overall finding.

The academic outcomes for COM11400 show repeating the course has nearly the opposite effect as the physics example. Students earn a higher course grade, cumulative GPA, and higher rates of 4- and 5-year graduation if they repeat COM11400 after earning a C or D.

Examination of 25 of Purdue's largest undergraduate courses shows a mixed result. In 9 cases, the advantage of taking the initial C and moving ahead passes the statistical significance test. In 6 cases, outcomes are significantly better when students repeat the course. In the remaining 10 courses, the difference between repeaters and students who moved ahead was small enough to not be statistically significant.

It is beyond the scope of this report to investigate the characteristics of courses that make repeating or moving on the better strategy. Some possible speculations might be that the course instills foundational skills that are needed in later courses. These skills may be needed primarily within the major, or needed for all university level work. Effective communication skills, for example, may be so necessary as to justify repeated attempts at COM11400.

### Academic Outcomes for MA16100 & MA16200, after initial C & D grades

	Count	MA162 grade	St Dev	4yr Grad	5 yr Grad	Grade sig.
Moved on after C	886	1.90	0.884	31%	60%	
Repeated after C	149	2.15	0.859	21%	47%	0.001
Moved on after D	10	1.13	0.753	10%	30%	
Repeated after D	153	1.63	1.010	21%	45%	0.064

Over the interval of the study, 1035 students earned an initial C in MA16100 and later attempted MA16200. Most moved on to MA16200 directly; and 15% repeated MA16100. The assessment shows a difference in average grade for the second course of 1.90 to 2.15. Both grades are in the C- to C range. But the difference is statistically significant.

A second course-to-course test was done for PHYS17200 and PHYS24100. And in this case, student who repeated after a C actually fared worse in the latter course.

Examination of several more course-to-course assessments yielded a balanced result. In half of observed cases, students earned significantly better grades in the second course if they repeated the first course after earning a C or D. In the other half of cases, the differences were small enough to not be statistically significant.

## Conclusions and Implications

Repeating courses is a common practice at Purdue with significant impact on students' academic success and on management of academic resources. Repeating courses usually enables a student to improve his or her course grade. But the longer-term consequences are less certain. In many cases, it appears that repeating a course makes the student no more likely to graduate on time or to achieve a higher cumulative GPA. Further assessment of course repeats should move in two directions. First, more courses should be assessed with respect to the consequences of repeating. Second, course content, grading strategies, and other factors should be examined to determine why some courses reward repeating and others do not.

Repeating a course after a C or D may be advisable or not depending on several factors – especially whether the course content is foundational to the major or to academic success. In the example of PHYS17200, students who repeated the course after an initial C improved their course grade on average from 2.07 to 2.39. But in other measures, better results follow if students did not retake PHYS17200. Students who accepted the first grade of C and proceeded with their plan of study earn a slightly higher final cumulative GPA, and graduation rates, both in 4 years and 5 years, was significantly higher for students who proceeded than for those who repeated.

### Academic Outcomes for COM11400, after initial C & D grades

	Count	Grade value	Grad GPA	4yr Grad	5 yr Grad	4-yr sig.	5-yr sig.
Moved on after C	1,086	2.00	2.79	23%	43%		
Repeated after C	57	2.24	2.91	25%	54%	0.588	0.955
Moved on after D	204	1.00	2.73	16%	30%		
Repeated after D	99	2.26	2.76	16%	31%	0.551	0.619

The foregoing assessment correlates course repeats decisions with major academic outcomes, and readers may object that one course outcome is a small factor and unlikely to determine a graduation rate. In response to this objection, we further assessed course repeats by looking forward to the next course in the students' academic sequence. For example, after taking MA16100, many students went on to MA16200. Using nearly the same method as above, we assessed whether MA16200 grades were different for students who repeated MA16100 after a C or D.

### Academic Outcomes for PHYS17200 & PHYS24100, after initial C & D grades

	Count	PHYS24100	St Dev	4yr Grad	5 yr Grad	Grade sig.
Moved on after C	859	1.98	0.916	35%	65%	
Repeated after C	43	1.91	0.834	14%	44%	0.703
Moved on after D	95	1.45	0.950	24%	49%	
Repeated after D	104	1.65	0.921	14%	46%	0.069