

# The Association between First Semester Academic Load and First Semester GPA for New Freshmen at UW-Madison

---

## Abstract

At the foundation of our advising strategy for incoming new freshmen is the belief that a lighter first semester academic load will lead to better first semester grades. For this reason, we generally advise incoming new freshmen to take 12-13 credits rather than the 15 credits per semester needed by most students for timely degree completion.

We tested the assertion that a lighter academic load results in higher grades by evaluating the association between first semester academic load and first semester GPA. **Findings from this analysis do not support limiting the first semester academic loads of new freshmen.** Contrary to longstanding assumptions, students' first semester academic load explains only a minor portion of first semester grade point averages. Furthermore, academic load and first semester GPA are positively correlated – higher academic loads are associated with greater likelihood of higher grade point averages.

## Summary of Key Findings and Implications

1. Results from this analysis do not substantiate the prevailing expectation of decreased first semester GPAs associated with increases in academic load. On the contrary, increased academic loads are associated with increased first semester GPAs.
2. Although academic preparation variables, such as ACT score and high school GPA, and enrollment variables, such as number of credits or course sections, are significant predictors of first semester GPA, they only account for, at most, one third of the variance in first semester GPAs.
3. The positive association between increased credits and course sections (academic load) and increased GPAs is observed for targeted minority students, students in the lowest and highest relative academic preparation groups, and students in different schools/colleges.
4. Some types of courses increase the likelihood of *lower* first semester GPAs. Students who take math and science courses are more likely to have lower first semester GPAs than students who don't have math and science courses. Moreover, the negative effect these courses have on GPA is not mitigated by reducing credits or course sections.
5. Some course increase the likelihood of *higher* first semester GPAs. In particular, participation in first-year interest groups (FIGs) increases the likelihood of higher first semester GPAs. Enrolling in a course that meets the Communications A requirement also tends to increase the likelihood of a higher first semester GPA for most new freshmen regardless of academic load.
6. Finally, any campus-wide strategy change in the way we advise new freshmen must be planned carefully. Increasing average number of credits taken by new freshmen from 13.7 to 15 is the equivalent of adding almost 500 additional new freshmen to the incoming class. Much of our flexibility in enrollment capacity is in upper-level undergraduate courses that most new freshmen are not eligible to take during their first semester. Without a concomitant increase in available seats in lower-level undergraduate courses, an increase in average credits will be frustrating for students who cannot get into needed courses.

## **Introduction**

Many advisors of new freshmen assume that a lighter first semester academic load will result in higher grades than students would have earned if they had taken a higher credit or course load. This assumption is consistent with the application of developmental psychology principles to academic advising where new freshmen progress from mastering simpler tasks (fewer credits) before tackling more challenging ones (more credits). At UW-Madison, new freshmen are generally advised to take 12-13 credits in their first semester – less than the average of 15 credits per semester needed to complete a four-year degree in four years or a five-year degree in five years.

The ongoing comprehensive review of UW-Madison's summer orientation for new students and renewed efforts to decrease time-to-degree (both to make room for new students and to increase affordability for enrolled students) call for evidence to justify our current developmental approach to advising new freshmen. Starting new freshmen with a lighter academic load may be "worth it" *if* the reduced load indeed results in a better foundational grade point average and *if* the students make up for the reduced credits in subsequent semesters. However, if either of these qualifications is not substantiated then we put students at risk for delayed time-to-degree and increased debt or costs.

## **Methodology**

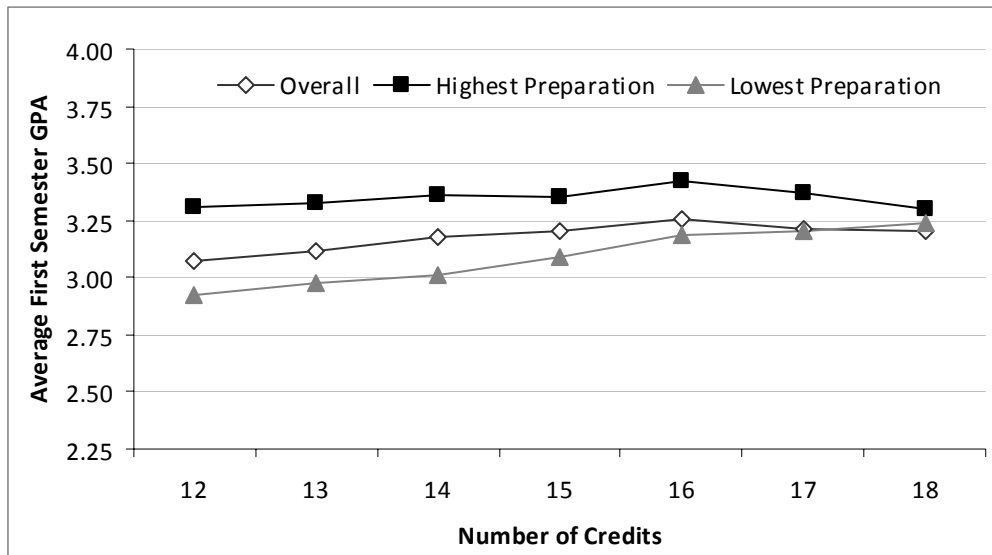
The purpose of this analysis is to examine the association between first semester academic load and first semester grade point average (GPA) for the purpose of academic advising. We use the two most recent cohorts of new freshmen (fall 2008 and fall 2009) as our analytic population. We examine students' first semester grade point averages (the GPA itself as well as several GPA thresholds) and the relationship to students' first semester academic load (measured by the number of credits and course sections). Because other analyses, both at the national level and at UW-Madison, demonstrate the influence of prior academic preparation in students' academic outcomes (GPA, retention, graduation) we control for academic preparation variables to minimize the chance that any association between GPA and academic load is primarily due to underlying academic preparation issues.

Advisors at UW-Madison are usually assigned to specific types of new freshmen. Advisor assignments are usually either based on 1) intended major or school/college or 2) membership or participation in specified groups or activities such as honors programs, athletics, Academic Advancement Program, CEO, Chancellor's Scholars etc. Especially because the results of this analysis may affect how we advise incoming new freshmen, it is important that advisors be confident that the results of this analysis pertain to the type of students they advise. For this reason, in addition to examining the association between GPA and academic load for the overall new freshman class, we also separately analyze the association for subsets of students in the new freshman class.

## **Results: Average First Semester GPA and Academic Load Measures**

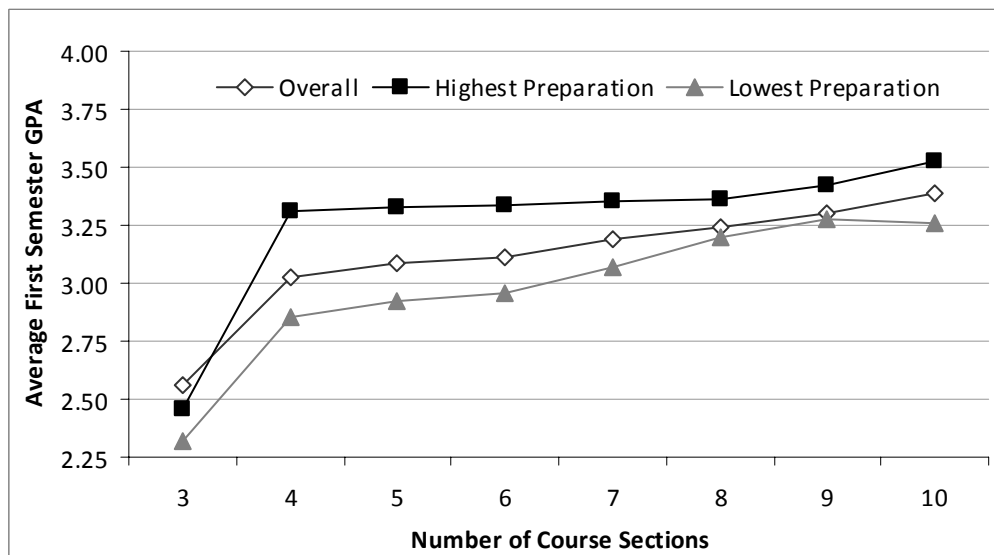
As the number of credits increases, first semester GPAs *increase* slightly (Chart 1, Appendix A). This is contrary to the prevailing expectation of decreased first semester grade point averages as credits increase. Despite the slight increase in the average first semester GPA associated with increased credits, the predictive ability of credits alone is extremely low. In other words, it is not possible to predict a student's first semester GPA accurately based solely on knowledge of his or her attempted credits. The pattern of slightly increased average first semester GPAs associated with increases in attempted credits is also observed for students in the highest academic preparation and lowest academic preparation groups.

**Chart 1**  
**Average First Semester GPA by Number of Attempted Credits**  
**New Freshmen in Fall 2008 and 2009**



As the number of course sections increases, first semester GPAs *increase* slightly (Chart 2, Appendix B). This is also contrary to the prevailing expectation of decreased first semester GPAs as the number of course sections increases. Despite the slight increase in the average first semester GPA associated with increased course sections, the predictive ability of course sections alone is also extremely low. As with credits, it is not possible to predict a student's first semester GPA accurately based solely on knowledge of his or her attempted course sections. The pattern of slightly increased average first semester GPAs associated with increases in attempted credits is also observed for students in both the highest and lowest academic preparation groups.

**Chart 2**  
**Average First Semester GPA by Number of Attempted Course Sections**  
**New Freshmen in Fall 2008 and 2009**



### **Results: Logistic Regression Modeling**

As an alternative to the simple linear association between academic load and first semester GPA, we examined the association between academic load and the likelihood of achieving specified grade point thresholds, controlling for the effects of academic preparation. We constructed a binary logistical regression model with a binary GPA threshold as the dependent variable and academic preparation and enrollment indicators as independent variables.

In constructing logistic regression models we chose the model that resulted in the highest percentage of correct classifications and not necessarily the model where academic load measures had the strongest effect. Because the purpose of the models is to predict first semester GPA for advisors of incoming new freshmen, we limit the model to variables that can be influenced by advisors during orientation. This means that some variables with predictive significance were purposely left out of these models. For example, female new freshmen tend to have higher grades than male new freshmen. Knowing a student's gender helps us more accurately predict first semester GPA. However, knowing a student's gender doesn't have any practical use for advisors trying to help students get the highest possible first semester GPA so a gender variable was not included in the logistic regression models.

Because we want to understand the significant relationships between academic load and first semester GPA for certain types of students, and because advisors are often assigned to specific types of new freshmen, we developed a regression model for all students and then limited the model to new freshmen from these groups:

- new freshmen in the College Letters & Science
- new freshmen in the College of Agriculture and Life Sciences
- new freshmen in the College of Engineering
- new freshmen on the highest end of the academic preparation spectrum
- new freshmen on the lowest end of the academic preparation spectrum
- targeted minority new freshmen

In our model we examine four binary (yes/no) GPA thresholds – whether students earned a 2.00 or above, a 2.50 or above, a 3.00 or above, or a 3.50 or above. These thresholds reflect standard grading intervals at UW-Madison. At the low end, a 2.00 is generally the minimum GPA necessary to maintain good standing and make “satisfactory academic progress” in terms of financial aid eligibility. At the high end, a 3.50 or above is often the threshold for honors such as dean's list and other honors.

Several academic preparation variables were significant in one or more of the models. These variables include:

- English placement test scores
- High school GPA
- Whether a student took either AP calculus exam and scored at least a 4 (of 5)
- ACT score

Several enrollment variables were significant in one or more of the models. These variables are:

- Number of attempted credits
- Number of attempted course sections
- Whether a student is enrolled in any math course
- Whether a student is enrolled in any biological science course
- Whether a student is enrolled in any physical or natural science course (other than math)
- Whether a student is enrolled in a course than meets the Comm A general education requirement
- Whether a student is enrolled in a first-year interest group (FIG)

The results of these models are summarized in Tables 1 and 2 (details provided in Appendices C-H). A “+” sign indicates variables that *increase* the odds of achieving the dependent variable (either at least a 2.00 or at least a 3.50 GPA). A “-” sign indicates variables that *decrease* the odds of achieving the dependent variable. For example, Table 1 shows that English placement test scores are significant predictors of achieving at least a 2.00 for all new freshmen, new freshmen in the lowest academic preparation group, new freshmen in the highest academic preparation group, targeted minority new freshmen, and new freshmen in the College of Letters and Science. The fact that there is neither a “+” or “-” indicator for CALS and Engineering means that this variable was not a significant predictor of achieving a GPA of 2.00 or higher for these students.

Consistent with previous analysis we have conducted on student outcomes, the strength of these models (shown in the appendices) is relatively low. Depending on the student population in the model, only between 13% and 34% of the variance in first semester GPAs can be explained by these variables. This means that the biggest factors influencing first semester GPA are not related to academic preparation, the number of credits or course sections taken, or other variables we have quantified.

Of primary interest in this analysis is whether credits or course sections affect the odds of new freshmen achieving at least a 2.00 or at least a 3.50. When the number of credits and course sections was significant in these models it was always significant in a positive direction. In other words, increased credits and course sections are associated with increased GPA, exactly the opposite result expected under the prevailing developmental advising approach.

**Table 1**  
**Summary of Significant Predictors of First Semester GPA using Binary Logistic Regression**  
**First Semester GPA Equals 2.00 or Above**  
**New Freshmen in Fall 2008 and 2009**

Independent Variables	Dependent Variable: GPA = 2.00 or above						
	All	Low Prep.	High Prep.	Targeted Minority	L&S	CALS	Engin.
<i>Academic Preparation Variables</i>							
• English Placement Test Score	+	+	+	+	+		
• High School GPA	+	+	+	+	+	+	+
• High School AP Calculus	+	+			+		+
• ACT/SAT Score							
<i>Enrollment Variables</i>							
• Number of Credits							
• Number of Course Sections	+	+	+	+	+	+	
• Has a Math Course	-	-	-	-	-		
• Has a Biological Science Course							
• Has a Physical/Nat. Science Course	-			-	-		
• Has a ComMA Course	+	+			+		
• Enrolled in a FIG	+		+		+		

Note: A “+” indicates variables that are significant ( $p < 0.05$ ) positive predictors of the dependent variable for the population group specified. A “-” indicates variables that are significant negative predictors of the dependent variable for the population group specified. If no sign is present then the variable does not have a significant effect on the dependent variable for the group specified.

**Table 2**  
**Summary of Significant Predictors of First Semester GPA using Binary Logistic Regression**  
**First Semester GPA Equals 3.50 or Above**  
**New Freshmen in Fall 2008 and 2009**

Independent Variables	Dependent Variable: GPA = 3.50 or above						
	All	Low Prep.	High Prep.	Targeted Minority	L&S	CALS	Engin.
<i>Academic Preparation Variables</i>							
• English Placement Test Score	+	+	+	+	+		+
• High School GPA	+	+	+	+	+	+	+
• High School AP Calculus	+		+	+	+	+	+
• ACT/SAT Score	+	+	+		+		+
<i>Enrollment Variables</i>							
• Number of Credits		+				+	
• Number of Course Sections							+
• Has a Math Course	-	-	-		-		
• Has a Biological Science Course	-	-	-	-	-		
• Has a Physical/Nat. Science Course	-	-	-	-	-		
• Has a ComMA Course						-	+
• Enrolled in a FIG	+	+	+	+	+		

Note: A “+” indicates variables that are significant ( $p \leq 0.05$ ) positive predictors of the dependent variable for the population group specified. A “-” indicates variables that are significant negative predictors of the dependent variable for the population group specified. If no sign is present then the variable does not have a significant effect on the dependent variable for the group specified.

Although not directly related to the association between academic load and first semester GPA, there are several other key points in the results of these regression models. One, even among a very well qualified new freshman class, the effects of academic preparation are evident. Even though preparation does not explain a large part of a student’s first semester GPA, preparation does affect the likelihood of achieving a high first semester GPA.

Two, the most commonly used academic preparation control variable, the ACT score, is not the best predictor of first semester GPA, at least in this analysis. Consistent with other analyses we have conducted, high school GPA is a much stronger predictor, possibly because it is finer grained than an ACT score and/or because grading in high school is similar to grading in college. The English placement test score is a consistent positive predictor in most models, possibly because students need to use reading, writing, and other communication skills in all classes. A student’s math placement test score is not a significant predictor and was not used in the final regression model. However, a different math-related variable, whether the student took and scored well on the AP calculus exams, proved to be a significant positive predictor of first semester GPA and remained in the final regression model.

Three, in addition to the number of credits and course sections, other enrollment variables proved to be significant predictors of first semester GPA. Having any math course is a consistent negative predictor of the likelihood of achieving first semester GPA thresholds. We tested various measures in the models to see if this effect was the result of any specific math course and it was not. Even among students at the same math placement level, student who took math had lower first semester GPAs, on average, than similarly prepared students who did not enroll in a math course.

Four, science courses are also significant negative predictors in many of the models we tested. Enrolling in a science course does not decrease the likelihood of achieving at least a 2.00 first semester GPA. However, students who have a science class are less likely to achieve a higher first semester GPA. In our regression model we tested biological science courses and non-math physical/natural science courses as separate variables and found different effects (but all negative), depending on the population of student in the model.

Five, having a Comm A course increased the likelihood of achieving at least a 2.00 for most students. The Comm A variable is the only variable that has both significant positive and significant negative predictive value in our models. For new freshmen in CALS, having a Comm A course decreases the likelihood of achieving a GPA of 3.50 or higher. For students in Engineering, having a Comm A course increases the likelihood.

Finally, enrollment in a first-year interest group (FIG) was positively associated with achieving the 2.00 and 3.50 GPA thresholds for students. Participation in a FIG was the only enrollment variable that was a positive predictor of achieving at a first semester GPA of at least 3.50.

### **Conclusions and Recommendations**

This analysis does not find any evidence to substantiate the prevailing expectation of decreased first semester GPAs associated with increases in academic load. Our findings are exactly the opposite, namely that increases to new students' first semester credits and course sections result in increased grade point averages. This finding is true for many different types of students, including targeted minority students as well as students who have the most and least relative academic preparation.

Our analysis also reveals certain types of courses that increase the likelihood of lower GPAs. In particular, new freshmen who enroll in math and/or science courses have increased likelihood of lower first semester GPAs. These courses may be more difficult for students or they may have grading rubrics that differ from other courses that new freshmen typically take. Although it may be tempting for advisors to recommend limiting credits for students who are taking math and science courses in the hope that their advisees will earn higher grades in these courses, the results of our analysis do not support this strategy. New freshmen earn lower grades in math and science courses regardless of the number of credits or course sections they have. Moreover, the potential negative effects of GPA-risky courses are mitigated by the presence of other courses to balance the GPA. The more other courses there are to balance the grades in math or science course, the less effect any one course has.

First-year interest groups (FIGs) are positively associated with first semester GPA. Students who enroll in FIGs tend to have higher first semester GPAs even after controlling for academic preparation. If our institutional goal is to have students start their college career with a good foundational GPA, we should expand the availability of FIGs.

The results from this analysis do not provide any evidence to justify advising students to limit their first semester academic loads in order to achieve a higher first semester GPA. There may be other reasons, such as work, family obligations, and extracurricular activities that should be considered when deciding on a first semester academic schedule but concerns about GPA are unfounded.

Finally, if this analysis provides enough convincing evidence to stop the practice of limiting the credit loads of new freshmen for the sake of GPA, we need to plan well in advance of the fall enrollment period. Raising the number of credits taken by new freshmen from the current average of 13.7 to 15 is the equivalent of adding an additional 500 new freshmen annually to the incoming class. A change of this magnitude will require coordination with staff in enrollment management and academic departments and must be implemented well in advance of the fall course enrollment period.

**Appendix A**  
**Average First Semester GPA by Number of Attempted Credits**

Credits	All New Freshmen		Highest Preparation Students		Lowest Preparation Students	
	GPA	Students	GPA	Students	GPA	Students
12	3.07	1,948	3.31	835	2.92	679
13	3.12	2,910	3.33	1,395	2.98	937
14	3.18	2,937	3.36	1,515	3.01	858
15	3.20	1,768	3.35	946	3.09	529
16	3.26	923	3.42	507	3.19	323
17	3.21	352	3.37	193	3.20	133
18	3.20	209	3.30	131	3.24	83
R <sup>2</sup>	< 0.01	11,047	< 0.01	5,522	< 0.01	3,542

**Appendix B**  
**Average First Semester GPA by Number of Attempted Course Sections**

Course Sections	All New Freshmen		Highest Preparation Students		Lowest Preparation Students	
	GPA	Students	GPA	Students	GPA	Students
3	2.56	94	2.46	24	2.32	36
4	3.03	427	3.31	115	2.85	162
5	3.09	1,776	3.33	619	2.92	655
6	3.11	3,090	3.34	1,352	2.96	993
7	3.19	3,081	3.35	1,727	3.07	884
8	3.24	1,853	3.36	1,177	3.20	564
9	3.30	573	3.42	380	3.28	183
10	3.39	153	3.53	126	3.26	52
R <sup>2</sup>	0.02	11,047	0.01	5,522	0.01	3,542



**Appendix C**  
**Binary Logistic Regression Odds Ratios for Predicting Specified First Semester GPA Thresholds**

Independent Variables	Dependent Variable (Binary)			
	2.00 or Over	2.50 or Over	3.00 or Over	3.50 or Over
<i>Academic Preparation Variables</i>				
• English Placement Test Score	<b>1.004</b>	<b>1.002</b>	<b>1.003</b>	<b>1.004</b>
• High School GPA	<b>6.762</b>	<b>6.716</b>	<b>8.013</b>	<b>12.822</b>
• High School AP Calculus	<b>2.148</b>	<b>1.925</b>	<b>1.592</b>	<b>1.514</b>
• ACT/SAT Score	1.012	<b>1.055</b>	<b>1.077</b>	<b>1.078</b>
<i>Enrollment Variables</i>				
• Number of Credits	1.030	1.042	1.015	1.018
• Number of Course Sections	<b>1.218</b>	<b>1.126</b>	<b>1.082</b>	1.002
• Has a Math Course	<b>0.404</b>	<b>0.403</b>	<b>0.545</b>	<b>0.710</b>
• Has a Biological Science Course	1.055	<b>0.862</b>	<b>0.760</b>	<b>0.747</b>
• Has a Physical/Nat. Science Course	<b>0.697</b>	<b>0.629</b>	<b>0.713</b>	<b>0.783</b>
• Has a Comma Course	<b>1.496</b>	<b>1.327</b>	<b>1.186</b>	1.053
• Enrolled in a FIG	<b>1.518</b>	<b>1.558</b>	<b>1.991</b>	<b>1.927</b>
<i>Pseudo R<sup>2</sup></i>	0.153	0.178	0.222	0.234
<i>Total Students</i>	10,977	10,977	10,977	10,977

**Appendix D**  
**Binary Logistic Regression Odds Ratios for Predicting Specified First Semester GPA Thresholds**  
**Targeted Minority New Freshmen**

Independent Variables	Dependent Variable (Binary)			
	2.00 or Over	2.50 or Over	3.00 or Over	3.50 or Over
<i>Academic Preparation Variables</i>				
• English Placement Test Score	<b>1.004</b>	1.002	<b>1.003</b>	<b>1.005</b>
• High School GPA	<b>3.222</b>	<b>3.008</b>	<b>4.472</b>	<b>4.407</b>
• High School AP Calculus	1.622	1.574	<b>2.011</b>	<b>2.699</b>
• ACT/SAT Score	1.020	<b>1.074</b>	<b>1.069</b>	1.041
<i>Enrollment Variables</i>				
• Number of Credits	1.038	<b>1.157</b>	1.036	0.983
• Number of Course Sections	<b>1.173</b>	1.058	1.077	0.949
• Has a Math Course	<b>0.519</b>	<b>0.520</b>	<b>0.577</b>	0.764
• Has a Biological Science Course	0.759	<b>0.689</b>	<b>0.572</b>	<b>0.462</b>
• Has a Physical/Nat. Science Course	<b>0.566</b>	<b>0.606</b>	<b>0.579</b>	<b>0.594</b>
• Has a Comma Course	1.268	1.293	1.078	0.776
• Enrolled in a FIG	1.384	<b>1.738</b>	<b>2.318</b>	<b>2.730</b>
<i>Pseudo R<sup>2</sup></i>	0.127	0.160	0.238	0.228
<i>Total Students</i>	1,125	1,125	1,125	1,125

Note: Odds ratios in **bold** are significant at the  $p \leq .05$  level. Odds ratios that are  $< 1.00$  indicate independent variables that decrease the odds of the dependent variable. Odds ratios that are  $> 1.00$  indicate independent variables that increase the odds of the dependent variable. The size of the odds ratio can be used to evaluate the relative strength of an independent variable's effect on the dependent variable.

**Appendix E**  
**Binary Logistic Regression Odds Ratios by School/College (GPA Threshold >= 2.00)**

Independent Variables	Primary Academic Group		
	Letters & Science	Agriculture and Life Sciences	Engineering
<i>Academic Preparation Variables</i>			
• English Placement Test Score	<b>1.004</b>	1.000	1.002
• High School GPA	<b>6.360</b>	<b>6.723</b>	<b>10.857</b>
• High School AP Calculus	<b>1.701</b>	6.760	<b>4.158</b>
• ACT/SAT Score	1.019	1.071	1.001
<i>Enrollment Variables</i>			
• Number of Credits	1.039	1.136	1.001
• Number of Course Sections	<b>1.228</b>	<b>1.655</b>	1.170
• Has a Math Course	<b>0.438</b>	0.454	0.965
• Has a Biological Science Course	1.038	0.922	1.436
• Has a Physical/Nat. Science Course	<b>0.729</b>	0.602	0.820
• Has a CommA Course	<b>1.991</b>	1.089	0.929
• Enrolled in a FIG	<b>1.699</b>	0.619	0.906
<i>Pseudo R<sup>2</sup></i>	0.151	0.214	0.197
<i>Total Students</i>	7,928	713	1,632

**Appendix F**  
**Binary Logistic Regression Odds Ratios by School/College (GPA Threshold >= 3.50)**

Independent Variables	Primary Academic Group		
	Letters & Science	Agriculture and Life Sciences	Engineering
<i>Academic Preparation Variables</i>			
• English Placement Test Score	<b>1.005</b>	1.001	<b>1.003</b>
• High School GPA	<b>10.276</b>	<b>17.258</b>	<b>32.423</b>
• High School AP Calculus	<b>1.539</b>	<b>2.293</b>	<b>1.325</b>
• ACT/SAT Score	<b>1.074</b>	1.091	<b>1.101</b>
<i>Enrollment Variables</i>			
• Number of Credits	1.021	<b>1.176</b>	0.934
• Number of Course Sections	0.981	0.975	<b>1.211</b>
• Has a Math Course	<b>0.716</b>	0.990	0.664
• Has a Biological Science Course	<b>0.737</b>	0.995	1.534
• Has a Physical/Nat. Science Course	<b>0.820</b>	0.961	0.817
• Has a CommA Course	<b>1.150</b>	<b>0.583</b>	0.768
• Enrolled in a FIG	<b>1.827</b>	0.890	1.174
<i>Pseudo R<sup>2</sup></i>	0.233	0.343	0.251
<i>Total Students</i>	7,928	713	1,632

Note: Odds ratios in **bold** are significant at the p<=.05 level. Odds ratios that are <1.00 indicate independent variables that decrease the odds of the dependent variable. Odds ratios that are > 1.00 indicate independent variables that increase the odds of the dependent variable. The size of the odds ratio can be used to evaluate the relative strength of an independent variable's effect on the dependent variable.

**Appendix G**  
**Binary Logistic Regression Odds Ratios for Predicting Specified First Semester GPA Thresholds**  
**Lowest Academic Preparation New Freshmen**

Independent Variables	Dependent Variable (Binary)			
	2.00 or Over	2.50 or Over	3.00 or Over	3.50 or Over
<i>Academic Preparation Variables</i>				
• English Placement Test Score	<b>1.003</b>	<b>1.002</b>	<b>1.002</b>	<b>1.004</b>
• High School GPA	<b>4.656</b>	<b>4.671</b>	<b>6.386</b>	<b>8.949</b>
• High School AP Calculus	<b>1.708</b>	<b>1.510</b>	<b>1.312</b>	1.126
• ACT/SAT Score	1.042	<b>1.091</b>	<b>1.113</b>	<b>1.119</b>
<i>Enrollment Variables</i>				
• Number of Credits	0.968	<b>1.081</b>	1.047	<b>1.088</b>
• Number of Course Sections	<b>1.239</b>	<b>1.106</b>	<b>1.086</b>	1.031
• Has a Math Course	<b>0.544</b>	<b>0.507</b>	<b>0.628</b>	<b>0.751</b>
• Has a Biological Science Course	0.954	0.884	<b>0.703</b>	<b>0.655</b>
• Has a Physical/Nat. Science Course	0.774	<b>0.682</b>	<b>0.714</b>	<b>0.807</b>
• Has a Comma Course	<b>1.704</b>	<b>1.458</b>	1.135	0.955
• Enrolled in a FIG	1.393	<b>1.599</b>	<b>2.013</b>	<b>1.986</b>
<i>Pseudo R<sup>2</sup></i>	0.140	0.169	0.230	0.262
<i>Total Students</i>	3,542	3,542	3,542	3,542

**Appendix H**  
**Binary Logistic Regression Odds Ratios for Predicting Specified First Semester GPA Thresholds**  
**Highest Academic Preparation New Freshmen**

Independent Variables	Dependent Variable (Binary)			
	2.00 or Over	2.50 or Over	3.00 or Over	3.50 or Over
<i>Academic Preparation Variables</i>				
• English Placement Test Score	<b>1.003</b>	<b>1.002</b>	<b>1.002</b>	<b>1.003</b>
• High School GPA	<b>14.975</b>	<b>11.707</b>	<b>11.564</b>	<b>20.934</b>
• High School AP Calculus	1.390	<b>1.493</b>	<b>1.290</b>	<b>1.387</b>
• ACT/SAT Score	0.947	<b>1.057</b>	<b>1.080</b>	<b>1.083</b>
<i>Enrollment Variables</i>				
• Number of Credits	0.972	1.000	0.970	0.986
• Number of Course Sections	<b>1.214</b>	<b>1.170</b>	<b>1.166</b>	1.039
• Has a Math Course	<b>0.336</b>	<b>0.326</b>	<b>0.499</b>	<b>0.663</b>
• Has a Biological Science Course	1.731	0.831	<b>0.758</b>	<b>0.812</b>
• Has a Physical/Nat. Science Course	0.975	<b>0.640</b>	<b>0.630</b>	<b>0.748</b>
• Has a Comma Course	1.209	<b>1.480</b>	<b>1.347</b>	1.074
• Enrolled in a FIG	<b>4.227</b>	<b>0.796</b>	<b>2.185</b>	<b>1.742</b>
<i>Pseudo R<sup>2</sup></i>	0.158	0.145	0.159	0.194
<i>Total Students</i>	5,522	5,522	5,522	5,522

Note: Odds ratios in **bold** are significant at the  $p \leq .05$  level. Odds ratios that are  $< 1.00$  indicate independent variables that decrease the odds of the dependent variable. Odds ratios that are  $> 1.00$  indicate independent variables that increase the odds of the dependent variable. The size of the odds ratio can be used to evaluate the relative strength of an independent variable's effect on the dependent variable.

### **Data Sources**

All variables were retrieved from ad hoc queries using data views in the InfoAccess data warehouse. Specific data views employed in this analysis include: Frozen Enrollment Demo, Stdnt Ugrd Applicant, Stdnt High School Codes, Ugrd Recruitment Category, Hous Resident, Retention Course History, Retention Semester History, Retention Drop History, Stdnt Test, and Retention Student Group History.

### **Population Variables**

**Study Population:** New freshmen in fall 2008 and 2009 who had a full-time credit load (12-18 credits) on the official fall census date (10<sup>th</sup> day of semester). Students who did not complete their first semester and therefore had no first semester GPA (the dependent variable in this analysis) are excluded.

**Highest Academic Preparation Group:** New freshmen in this group are more than one standard deviation *above* the “average” new freshmen in one or more of the following preparation variables: ACT score (>31), high school GPA (4.00), English placement (placement test score >663 or score of 4-5 on the AP English Language or Literature exam) or math placement (initial placement of calculus or above). Students who meet any one of these criteria are coded as 1. Students who meet none of these criteria are coded as 0. SAT scores for students who only took the SAT were converted to ACT scores using a concordance table provided by The College Board. This grouping has no significance beyond the purpose of this analysis.

**Lowest Academic Preparation Group:** New freshmen in the lowest preparation group are more than one standard deviation *below* the “average” new freshmen in one or more of the following preparation variables: ACT score (<25), high school GPA (<3.30), English placement (placement test score <485 or placement into ESL), or math placement (initial placement below College Algebra). Students who meet any one of these criteria are coded as 1. Students who meet none of these criteria are coded as 0. SAT scores for students who only took the SAT were converted to ACT scores using a concordance table provided by The College Board. This grouping has no significance beyond the purpose of this analysis.

**Targeted Minority:** Non-international students who are African American or Black, Hispanic or Latino(a), American Indian, or Southeast Asian (Vietnamese, Laotian, Hmong, or Cambodian).

### **Academic Preparation Variables**

**English Placement Score:** A student’s score on the UW System English Placement Test. Scores for students who did not take the test were imputed based on ACT score.

**High School GPA:** A student’s academic GPA at the time of admission. High school GPA is recalculated by the Office of Admissions. It only includes academic courses and is on a 4.00 scale.

**AP Math:** Students who took either the AP Calculus AB or Calculus BC tests and scored a 4 or 5 are coded as 1. All others are 0. In this model, this variable was highly predictive of first semester GPA and was a stronger predictor than other measures of math placement such as the specific score on the math placement test components or the resulting math placement level.

**ACT/SAT Score:** The student’s highest ACT or SAT score. Scale is 1 to 36. SAT scores for students who only took the SAT were converted to ACT scores using a concordance table provided by The College Board.

### **Enrollment Variables**

**Attempted course sections:** The number of course sections that students had on the 10<sup>th</sup> day of their first fall semester. For example, Chemistry 103 counts as 3 sections (lecture, discussion, lab).

**Attempted credits:** The credits students had on the 10<sup>th</sup> day of the first fall semester. For example, Chemistry 103 counts as 4 credits.

**Biological Science Course:** Students who have any course with a breadth designation of B as of the 10<sup>th</sup> day of the first fall semester are coded as 1. All other students are coded as 0.

**Comm A Course:** Students who are enrolled for any course that meets the Communications A requirement on the 10<sup>th</sup> day of the first fall semester are coded as 1. All others are coded as 0.

**First-Year Interest Group (FIG):** Students who had a student group record indicating registration for a FIG in their first fall semester are coded as 1. All others are coded as 0. In this analysis, we did not analyze the impact of each FIG individually.

**Math Course:** Students who are enrolled for any math course on the 10<sup>th</sup> day of the first fall semester are coded as 1. Students who are not enrolled in any math class on the 10<sup>th</sup> day are coded as 0. In models predicting first semester GPA, this aggregate variable was stronger than any math class alone. Also, this variable proved to be significant irrespective of math placement level.

**Physical/Natural Science Course:** Students who have any non-math course with a breadth designation of P or N as of the 10<sup>th</sup> day of the first fall semester are coded as 1. All other students are coded as 0.