SRI International

Research Brief: First College Courses Taken by Florida IB Students

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April 2011

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Summary of Findings

The International Baccalaureate curriculum is designed to provide rigorous preparation for college. To examine the relationship between performance on IB exams and college course performance in the same subjects, we used data for IB students from Florida. Florida has many high school students participating in IB and maintains a comprehensive state data system that contains enrollment, course, and graduation information for in-state public postsecondary institutions. Focusing on the University of Florida, the postsecondary institution the greatest proportion of IB students attend, we found a positive association between students' scores on a given IB subject exam and their grades in their first college courses in that subject. That is, students who performed better on IB subject exams tended to earn higher grades in their first college courses in those subjects than students who did not perform as well on IB subject exams. We examined course-taking patterns for the following seven subjects: physics, chemistry, biology, mathematics, English, Spanish, and French.

Identification of First College Course Taken

For the 4845 students who took IB exams between spring 2000 and spring 2005 and who entered the University of Florida the next fall, we identified all the college courses that each student took in each focal subject within 2 years of matriculating at the university and then isolated the first course each student took in each subject area (Exhibits 4 through 10). IB offers both standard level (SL) and higher level (HL) courses, and we examined the first college course taken by IB exam level and by IB exam score, grouped into three score bands (1 to 3, 4 or 5, and 6 or 7). The highest frequency first courses overall for each focal subject were:

- Physics 48: General Physics with Calculus I
- Chemistry 45: General Chemistry (1 of 2)
- Biological Sciences 10: General Biology
- Mathematics (Calculus and Precalculus) 147: Precalculus Algebra/Trigonometry
- English Composition 210: Technical Writing
- Spanish Language 240: Intermediate Conversation I
- French Language 241: Intermediate French Conversation II.

In the sciences (physics, chemistry, and biology) as well as in Spanish, the highest frequency first course was the same for students who took HL exams as it was for those who took SL exams; in mathematics, English, and French, the highest frequency first course differed by IB exam level. Overall, however, we saw more variation in the highest frequency first college course taken by IB exam performance than by level of exam taken, with students scoring higher on both SL and HL exams entering more advanced college courses than their lower scoring peers.

The percentage of students who took an IB exam but did not take a course in the corresponding subject during their first 2 years of college varied greatly. The percentages (calculated from Exhibits 4 through 10) were as follows:

- Mathematics, 7 percent
- Chemistry, 32 percent
- Physics, 34 percent
- Biology and English, 56 percent
- French, 79 percent
- Spanish, 86 percent.

One possible explanation for this variation is the University of Florida general education requirements. To fulfill the 6-credit mathematics requirement, students need to score 5 or higher on the IB mathematics exam, and students need to take at least two IB science exams (and score a 5 on one of them) to fulfill all 9 college credits for the biological and physical science requirement.[1] Thus, many students in our cohort needed some coursework in science and mathematics to fulfill the University of Florida general education requirements. This was not the case for English and the foreign languages. In English, IB students who score a 4 or higher on the IB exam satisfy the general education composition requirement, meaning that over 97 percent of our cohort was exempt from this requirement. Finally, the University of Florida general education requirements do not include study of a foreign language, while coursework in a second language is a requirement of the IB Diploma Programme.

Relationship Between IB Exam Performance and Grades in First College Course

On average, students who performed better on IB subject exams earned higher grades in their first college course in the same subject than students who performed less well on these exams.

- Overall, 59 percent of students who scored a 6 or 7 on an IB exam in a given subject earned an A in their first college course in that subject (Exhibit 11).
- This percentage of As earned by students who scored a 6 or 7 was highest for English courses (72 percent, Exhibit 37) followed by science and French courses (65 percent and 66 percent, Exhibits 17 and 41, respectively), Spanish courses (59 percent, Exhibit 40), and mathematics courses (53 percent, Exhibit 29).

Although not great in number, students who entered directly into the second semester of General Chemistry or General Biology earned high grades in these subjects.

- 156 students who took the IB chemistry exam and scored a 4 or higher enrolled in General Chemistry II as their first college chemistry course. Half the students who scored a 4 or 5 on the exam earned As in the course, and nearly three quarters of those who scored a 6 or 7 earned As in the course (Exhibit 23).
- 296 students who took the IB biology exam enrolled in General Biology II as their first college biology course. Approximately one third of these students who scored a 4 or 5 on the exam earned As in the class, and 59 percent of those who scored a 6 or 7 earned As in the course (Exhibit 27).

Students who took the HL exam in mathematics had very high grades in their first college mathematics course, possibly reflecting their choice of course.

- More than 80 percent of students earned an A in Introduction to Engineering, regardless of score or test level (Exhibit 32).
- One quarter of IB students who took the HL exam in mathematics enrolled in Introduction to Engineering as their first college course in mathematics (calculated from Exhibit 7, row 13).

IB students earned high grades in their first English course in college regardless of score band: 93 percent of students who scored 6 or 7, 87 percent of students who earned 4 or 5, and 79 percent of those who earned a 3 or lower on the exam earned an A or a B in their first college English course (Exhibit 37).

[1] The exception is that students who score a 6 or 7 on the IB physics exam earn 10 college credits in physics.

Introduction

The International Baccalaureate curriculum is designed to provide rigorous preparation for college. The objective of this project was to examine the relationship between students' performance on IB exams and their college course performance in the same subjects. We used data for IB students from Florida because that state has many high school students participating in IB and maintains a comprehensive state data system that contains enrollment, course, and graduation information for in-state public postsecondary institutions. We focused on the University of Florida, which the greatest proportion of IB students attend. We examined course-taking patterns for seven subjects: physics, chemistry, biology, mathematics, English, Spanish, and French.

Methodology

We identified the first college course in each of seven focal subjects taken by IB students enrolled at the University of Florida and compared the performance in those courses of students who scored at varying levels on the corresponding IB subject exam. With the data available, we e were not able to compare IB students' grades with the average for a given course or discipline at the University of Florida.

Our cohort consisted of the 4845 students who took IB exams between spring 2000 and spring 2005 and who entered the University of Florida the next fall.[2] Students who are enrolled in the full IB Diploma Programme for their last 2 years of high school are considered diploma candidates, whereas students who take at least one IB exam in their junior or senior year of high school without the intention of completing the IB diploma are classified as IB certificate candidates. To be awarded the IB diploma, students must fulfill a variety of requirements including taking at least six IB assessments in different subject areas (scored 1 to 7) and earning a total of 24 points toward the diploma, primarily through their scores on these assessments as well as through fulfilling other diploma requirements.[3] Students can take IB courses at standard level (SL), representing 150 hours of instruction, or higher level (HL), representing 240 hours of instruction. For the IB diploma, students must earn a passing grade of 4 on six IB subject exams, including three higher level exams.

The majority of students in our cohort attempted the IB diploma: 98 percent (4,728 students) were diploma candidates, and 84 percent of them (3,961 students) earned the IB diploma (Exhibit 1). In comparison, 92 percent of the 14,083 Florida IB students who completed high school between 2000 and 2005 were diploma candidates, and 79 percent of them earned the IB diploma.[4] The high proportion of IB students attempting the full diploma in Florida may reflect two policies that made the full IB Diploma Programme particularly attractive for Florida high school students during this time period. First, diploma recipients with adequate standardized test scores qualified for merit-based college scholarships through the state's Bright Futures Scholarship Program. In addition, before 2006, students who entered the University of Florida having earned an IB diploma received college credit for scores of 4 or higher on either level of

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[2] Students who took IB courses but did not take any IB exams do not appear in our data. Because we wanted to look at courses taken in the first 2 years of college and had college course data through the 2006–07 academic year, we could not include students who matriculated at the University of Florida after fall 2005.

[3] To earn the diploma, students must also write an extended essay and complete a Theory of Knowledge course for which they can earn up to three additional points, and fulfill a service requirement.

[4] Sixty percent of 14,083 Florida IB students who completed high school between 2000 and 2005 matriculated at one of the 13 campuses of the Florida State University System, 57 percent of them at the University of Florida.

IB exams. Without the diploma, students could earn college credit only by scoring 5 or higher on HL exams.

Exhibit 1
Breakdown of Cohort by IB Status

IB Status	Number	Percent
All IB students		
Certificate candidates	117	2
Diploma candidates	4728	98
Total	4845	100
Diploma candidates		
Diploma received	3961	84
Diploma not received	767	16
Total	4728	100

Note: Our cohort consisted of a subset of the 14,083 Florida IB students who completed high school between 2000 and 2005, of whom 93 percent were diploma candidates; 60 percent of them matriculated at one of the 13 campuses of the Florida State University System, 57% at the University of Florida.

Exhibit 2 shows the number of students in our cohort who took the IB exam in each of the seven subjects examined. English, mathematics, and Spanish were the most common IB exams taken by students in the cohort, followed by biology and then chemistry, physics, and French. While nearly all students in our Florida cohort took an IB exam in mathematics or English, they were much more likely to attempt the HL exam in English than in mathematics: 96 percent of IB English students took the HL version, compared with 7 percent of IB mathematics students.

Exhibit 2
IB Students by Subject

Subject	SL Exam	HL Exam	Total	
			Number	Percent
Physics	**606**	**357**	**963**	**20**
Chemistry	**663**	**731**	**1394**	**29**
Biology	**875**	**2146**	**3021**	**62**
Mathematics	**4338**	**431**	**4769**	**98**
English	**183**	**4607**	**4790**	**99**
Spanish	**3424**	**302**	**3726**	**77**
French	**786**	**80**	**866**	**18**

All courses at the University of Florida are assigned to broader discipline categories through the Florida Department of Education's Statewide Course Numbering System. As shown in Exhibit 3, we grouped these disciplines by IB subject. We identified all the college courses that each

student took in each focal subject within 2 years of matriculating at the university and then isolated the first course taken for each student in each subject area.

Exhibit 3
College Disciplines Mapped to IB Exam Subjects

IB Subject	Corresponding College Discipline(s)
Physics	Physics
Chemistry	Chemistry and Biochemistry
Biology	Biological Sciences
Mathematics	Mathematics, Statistics, Engineering (all)
English	English Language and Literature, Language Arts and English Education
Spanish	Spanish Language and Literature
French	French Language and Literature

After identifying the highest frequency first course in each subject area, we examined students' grades in these courses based on their performance on the corresponding IB subject exam. For each IB subject exam, we grouped students into three score bands—1 to 3, 4 and 5, and 6 and 7—and then displayed the grade distribution in the first college courses taken by students in each of these score bands. In all these analyses, we included the grade of W for withdrawn; the college course data provided by the Florida Education Data Warehouse contained no grades of F for courses at the University of Florida.[5] In our analysis of college course performance, we did not include students who took the class pass/fail or received other nonstandard grade awards.

Results

This section is divided into two parts. We first present the highest frequency first college course taken by IB students at the University of Florida for each focal subject, and then we present our analysis of grades earned in these courses.

First College Course Taken

We identified the most common first college course taken at the University of Florida by students who took an IB exam in the corresponding subject. These highest frequency first courses were

- Physics 48: General Physics with Calculus I
- Chemistry 45: General Chemistry (1 of 2)
- Biological Sciences 10: General Biology
- Mathematics (Calculus and Precalculus) 147: Precalculus Algebra/Trigonometry
- English Composition 210: Technical Writing

[5] The codebook for the Florida Department of Education Data Warehouse includes grades of W (Withdrawal), WF (Withdrew Fail), and WP (Withdrew Pass); there were no grades of F, WF, or WP in the University of Florida records.

- Spanish Language 240: Intermediate Conversation I
- French Language 241: Intermediate French Conversation II

In the sciences (physics, chemistry, and biology) as well as in Spanish, the highest frequency first course was the same for students who took HL exams as for those who took SL exams; for example, General Physics with Calculus was the single most common first course for students who took either the SL or HL physics exam. In mathematics, English, and French, the highest frequency first course differed by IB exam level. The highest frequency first course for students who took the HL exam in mathematics was Introduction to Engineering, whereas it was Precalculus Algebra/Trigonometry for students who took the SL exam. In English, the small group of students who took the SL English exam enrolled in Rhetoric and Technical Writing in greater numbers than in Technical Writing, the highest frequency course for HL students. Finally, students who took the HL French exam entered Grammar and Syntax in higher numbers than in Intermediate French Conversation II.

Exhibits 4 through 10 show the most common first college course taken for each of the focal subjects for various subsets of IB students. The layout of these tables is consistent across the seven focal subjects:

- The first column defines the subset of IB students for the score band.
- The second column contains the name of the most common first college course taken in the subject by these students, and the third shows the number of students who took this course.
- The fourth column displays the number of these students who took any other first college course in the subject area during their first 2 years of college.
- The fifth column displays the number of these students who did not take any college course in the subject area during their first 2 years of college.

The subset of IB students described varies by row:

- The first row displays these numbers for students who did not take the IB exam in the given subject.
- Rows 2 through 5 include **all IB students** who took the IB exam for that particular subject (i.e., aggregated across SL and HL exam-takers).
- Rows 6 through 9 include all IB students who took the **SL exam** in the subject.
- Rows 10 through 13 include all IB students who took the **HL exam** in the subject.

In reading these exhibits, note that the number of students in each row always sums horizontally to the number of students in the subgroup, but the same is not true of the columns. Only the final column consistently sums vertically to the total for the subgroup of IB students. In columns 3 and 4, which show the number of students enrolling in the highest frequency first course and in any other first course in a particular subject, the number of students in each score band will sum only to the total number of students taking a highest frequency first course if this course is the same for students in each score band (as is the case with the first course taken by IB students who took the **HL** physics exam, see Exhibit 4) but not when the first course taken varies by score band (as is the case with the first course taken by IB students who took the **SL** physics exam).

As context for these tables, recall that students who entered the University of Florida before 2006 having earned an IB diploma received college credit for scores of 4 or higher on both SL and HL exams. Without the diploma, students could earn college credit only by scoring 5 or higher on an HL exam. Diploma recipients earned 3 to 4 college credits for a score of 4, 6 to 7 college credits

for a score of 5, and 6 to 10 credits for a score of 6 or higher, with the number of credits varying by subject. For some subjects, the credit earned through the IB examination could fulfill a general education requirement (i.e., distribution requirement) but did not count toward the major. More than 80 percent of students in our cohort earned the IB diploma and thus could receive credit for scores of 4 or higher on either version of the exam.

Not surprisingly given these policies, we see more variation in the highest frequency first course taken by IB exam performance than by level of exam taken, with higher scoring students entering more advanced college courses. For example, students who scored a 6 or 7 on the IB biology exam—either the SL or HL version—were most likely to start their college coursework in biology with General Biology II, whereas students who scored a 5 or lower were more likely to start with General Biology I (Exhibit 6). In the humanities, there was even more variation in the most common first course taken by score band. For example, in English, the students in each successive score band we examined entered progressively more advanced college English courses: Students who scored 3 or below were most likely to start with Freshman Composition I, students who scored 4 or 5 were mostly likely to start with Technical Writing, and students who scored 6 or higher were mostly likely to start with Rhetoric and Technical Writing (Exhibit 8).

The percentage of students who took an IB exam but did not take a course in the corresponding subject during their first 2 years of college varied greatly by subject, as follows (calculated from Exhibits 4 through 10):

- Mathematics, 7 percent
- Chemistry, 32 percent
- Physics, 34 percent
- Biology and English, 56 percent
- French, 79 percent
- Spanish, 86 percent.

One possible explanation for this variation is the University of Florida general education requirements. IB students could fulfill University of Florida general education requirements in composition (3 credits required), mathematics (6 credits required), and biological and physical sciences (9 credits required) using college credit earned through their scores on IB exams; however, only high-scoring students could satisfy all their general education requirements through IB exam scores. To fulfill the 6-credit mathematics requirement, students needed to score 5 or higher on the IB mathematics exam, and students needed to take at least two IB science exams and score a 5 on one to fulfill all 9 college credits for the biological and physical science requirement.[6] Thus, many students in our cohort needed some coursework in science and mathematics to fulfill the University of Florida general education requirements. This was not the case for English and the foreign languages. In English, IB students who scored a 4 or higher on the IB exam satisfied the general education composition requirement, meaning that over 97 percent of our cohort was exempt from this requirement. Finally, the University of Florida general education requirements do not include study of a foreign language, whereas coursework in a second language is a requirement of the IB Diploma Programme.

[6] The exception is that students who score a 6 or 7 on the IB physics exam earn 10 college credits in physics.

Exhibit 4
First College Course Taken, by IB Exam Score: Physics

IB physics exam score	Name of highest frequency first physics course	Number of students enrolling in highest frequency first physics course	Number of students enrolling in any other first physics course	Number of students who did not enroll in a physics course in college
IB alumni who did not take IB physics exam (N=3882)				
None (Did not take IB exam)	Astronomy 2: Descriptive Astronomy	551	1363	1968
All IB alumni who took IB physics exam (SL or HL) (N=963)				
1-3	Physics 48: General Physics with Calculus I	40	97	86
4-5	Physics 48: General Physics with Calculus I	188	168	199
6-7	Physics 48: General Physics with Calculus I	98	48	39
All scores	Physics 48: General Physics with Calculus I	326	313	324
IB alumni who took SL physics exam (N=606)				
1-3	Astronomy 2: Descriptive Astronomy	31	60	63
4-5	Physics 48: General Physics with Calculus I	98	109	132
6-7	Physics 48: General Physics with Calculus I	53	27	33
All scores	Physics 48: General Physics with Calculus I	176	202	228
IB alumni who took HL physics exam (N=357)				
1-3	Physics 48: General Physics with Calculus I	15	31	23
4-5	Physics 48: General Physics with Calculus I	90	59	67
6-7	Physics 48: General Physics with Calculus I	45	21	6
All scores	Physics 48: General Physics with Calculus I	150	111	96

Students who scored 6 or higher on the IB physics exam earned 10 credits in physics, those who scored a 5 received 7 credits, and those who scored a 4 received 3 credits. Regardless of performance in the IB exam, most students who took SL or HL physics enrolled in the first semester of General Physics with Calculus. Students who did not take an IB physics exam and students who scored lower than 4 on the SL exam enrolled most frequently in Descriptive Astronomy (Exhibit 4).

Exhibit 5
First College Course Taken, by IB Exam Score: Chemistry

IB chemistry exam score	Name of highest frequency first chemistry course	Number of students enrolling in highest frequency first chemistry course	Number of students enrolling in any other first chemistry course	Number of students who did not enroll in a chemistry course in college
IB alumni who did not take IB chemistry exam (N=3451)				
None (Did not take IB exam)	Chemistry 45: General Chemistry (1 of 2)	765	1085	1601
All IB alumni who took IB chemistry exam (SL or HL) (N=1394)				
1-3	Chemistry 45: General Chemistry (1 of 2)	153	114	167
4-5	Chemistry 45: General Chemistry (1 of 2)	340	176	230
6-7	Chemistry 46: General Chemistry (2 of 2)	63	102	49
All scores	Chemistry 45: General Chemistry (1 of 2)	550	398	446
IB alumni who took SL chemistry exam (N=663)				
1-3	Chemistry 45: General Chemistry (1 of 2)	59	52	79
4-5	Chemistry 45: General Chemistry (1 of 2)	158	81	128
6-7	Chemistry 45: General Chemistry (1 of 2)	46	38	22
All scores	Chemistry 45: General Chemistry (1 of 2)	263	171	229
IB alumni who took HL chemistry exam (N=731)				
1-3	Chemistry 45: General Chemistry (1 of 2)	94	62	88
4-5	Chemistry 45: General Chemistry (1 of 2)	182	95	102
6-7	Chemistry 46: General Chemistry (2 of 2)	42	39	27
All scores	Chemistry 45: General Chemistry (1 of 2)	287	227	217

By scoring a 5 or higher on the IB chemistry exam, students earned 8 credits in chemistry, including General Chemistry 1; students who scored 4 on the exam earned 4 college credits in chemistry. Only students who earned a 6 or 7 on the HL exam entered into the second semester of General Chemistry as their most frequent first chemistry course (Exhibit 5).

Exhibit 6
First College Course Taken, by IB Exam Score: Biology

IB biology exam score	Name of highest frequency first biology course	Number of students enrolling in highest frequency first biology course	Number of students enrolling in any other first biology course	Number of students who did not enroll in a biology course in college
IB alumni who did not take IB biology exam (N=1824)				
None (Did not take IB exam)	Biological Sciences 10: General Biology	371	269	1184
All IB alumni who took IB biology exam (SL or HL) (N=3021)				
1-3	Biological Sciences 10: General Biology	150	184	409
4-5	Biological Sciences 10: General Biology	495	338	1131
6-7	Biological Sciences 11: General Biology (continued)	108	46	160
All scores	Biological Sciences 10: General Biology	668	653	1700
IB alumni who took SL biology exam (N=875)				
1-3	Biological Sciences 10: General Biology	22	44	114
4-5	Biological Sciences 10: General Biology	92	80	404
6-7	Biological Sciences 11: General Biology (continued)	22	16	81
All scores	Biological Sciences 10: General Biology	121	y	599
IB alumni who took HL biology exam (N=2146)				
1-3	Biological Sciences 10: General Biology	128	140	295
4-5	Biological Sciences 10: General Biology	403	258	727
6-7	Biological Sciences 11: General Biology (continued)	86	30	79
All scores	Biological Sciences 10: General Biology	547	498	1101

Students earned 8 credits in biology by scoring 5 or higher on the IB biology exam or 4 credits by scoring 4 on the exam. Regardless of whether they took the IB biology exam, the most common first biology course taken by students was the first semester of General Biology. In contrast, students who scored a 6 or 7 on either level of the IB biology exam most frequently entered directly into the second semester of this course (Exhibit 6).

Exhibit 7
First College Course Taken, by IB Exam Score: Mathematics

IB mathematics exam score	Name of highest frequency first mathematics course	Number of students enrolling in highest frequency first mathematics course	Number of students enrolling in any other first mathematics course	Number of students who did not enroll in a mathematics course in college
IB alumni who did not take IB mathematics exam (N=76)				
None (Did not take IB exam)	Mathematics 147: Precalculus Algebra/Trigonometry*	18	56	2
All IB alumni who took IB mathematics exam (SL or HL) (N=4769)				
1-3	Mathematics 147: Precalculus Algebra/Trigonometry*	165	288	12
4-5	Mathematics 147: Precalculus Algebra/Trigonometry*	738	1748	185
6-7	Mathematics 147: Precalculus Algebra/Trigonometry*	368	1131	134
All scores	Mathematics 147: Precalculus Algebra/Trigonometry*	1271	3167	331
IB alumni who took SL mathematics exam (N=4338)				
1-3	Mathematics 147: Precalculus Algebra/Trigonometry*	156	191	8
4-5	Mathematics 147: Precalculus Algebra/Trigonometry*	737	1526	172
6-7	Mathematics 147: Precalculus Algebra/Trigonometry*	368	1049	131
All scores	Mathematics 147: Precalculus Algebra/Trigonometry*	1261	2766	311
IB alumni who took HL mathematics exam (N=431)				
1-3	Engineering (General) 2: Introduction to Engineering	24	82	4
4-5	Engineering (General) 2: Introduction to Engineering	53	170	13
6-7	Engineering (General) 2: Introduction to Engineering	26	56	3
All scores	Engineering (General) 2: Introduction to Engineering	103	308	20

*Full course title is Mathematics 147 (Calculus and Precalculus): Precalculus Algebra/Trigonometry

Almost all students took a version of the IB mathematics exam. The most common first mathematics course taken by students varied not by score level but by test level, with students who took the mathematics studies or mathematics methods exam (SL mathematics) most frequently enrolling in Precalculus Algebra/Trigonometry regardless of test performance, while students who took the mathematics HL exam most commonly taking Introduction to Engineering, regardless of test performance (Exhibit 7).

Exhibit 8
First College Course Taken, by IB Exam Score: English

IB English exam score	Name of highest frequency first English course	Number of students enrolling in highest frequency first English course	Number of students enrolling in any other first English course	Number of students who did not enroll in an English course in college
IB alumni who did not take IB English exam (N=55)				
None (Did not take IB exam)	English Composition 101: Freshman Composition Skills I	19	17	19
All IB alumni who took IB English exam (SL or HL) (N=4790)				
1-3	English Composition 101: Freshman Composition Skills I	73	29	31
4-5	English Composition 210: Technical Writing	369	1227	2090
6-7	English Composition 254: Rhetoric and Technical Writing	85	307	579
All scores	English Composition 210: Technical Writing	449	1641	2700
IB alumni who took SL English exam (N=183)				
1-3	English Composition 101: Freshman Composition Skills I	5	1	1
4-5	English Composition 210: Technical Writing	19	49	60
6-7	English Composition 254: Rhetoric and Technical Writing	10	10	28
All scores	English Composition 254: Rhetoric and Technical Writing	26	68	89
IB alumni who took HL English exam (N=4607)				
1-3	English Composition 101: Freshman Composition Skills I	68	28	30
4-5	English Composition 210: Technical Writing	350	1178	2030
6-7	English Composition 254: Rhetoric and Technical Writing	75	297	551
All scores	English Composition 210: Technical Writing	424	1572	2611

Nearly all the students in our cohort took an IB English exam, and most took the English HL exam. Students earned 3 college credits in English for a score of 5 or higher on the exam and 3 credits for a score of 4, fulfilling the general education requirement in composition; only 188 students in our cohort scored below this level (133 students) or did not take the IB English exam (55 students). Students can also place into higher level composition courses through a placement exam. Of the 4,790 students who took an IB English exam, 2,700 did not take an English course in college. For those who did, the most common

first English course taken varied by exam performance, with students who scored less than a 4 most frequently enrolling in Freshman Composition; those who scored a 4 or 5 enrolled in Technical Writing, and those who scored a 6 or 7 enrolled in Rhetoric and Technical Writing (Exhibit 8).

Exhibit 9
First College Course Taken, by IB Exam Score: Spanish

IB Spanish exam score	Name of highest frequency first Spanish course	Number of students enrolling in highest frequency first Spanish course	Number of students enrolling in any other first Spanish course	Number of students who did not enroll in a Spanish course in college
IB alumni who did not take IB Spanish exam (N=1119)				
None (Did not take IB exam)	Spanish Language 130: Elementary Spanish I Accelerated	39	27	1053
All IB alumni who took IB Spanish exam (SL or HL) (N=3726)				
1-3	Spanish Language 116: Preparation for Intermediate Spanish	11	9	246
4-5	Spanish Language 201: Intermediate Level: General Review of Basic Skills II	86	151	2067
6-7	Spanish Language 300: Review Grammar and Syntax I	115	168	873
All scores	Spanish Language 240: Intermediate Conversation I	160	380	3186
IB alumni who took SL Spanish exam (N=3424)				
1-3	Spanish Language 116: Preparation for Intermediate Spanish	11	8	240
4-5	Spanish Language 201: Intermediate Level: General Review of Basic Skills II	84	132	1985
6-7	Spanish Language 300: Review Grammar and Syntax I	92	140	732
All scores	Spanish Language 240: Intermediate Conversation I	136	331	2957
IB alumni who took HL Spanish exam (N=302)				
1-3	Spanish Language 130: Elementary Spanish I Accelerated	1	0	6
4-5	Spanish Language 240: Intermediate Conversation I	12	9	82
6-7	Spanish Language 300: Review Grammar and Syntax I	23	28	141
All scores	Spanish Language 240: Intermediate Conversation I	24	49	229

Whereas many IB students (3,726) took an IB Spanish exam, most of them (3,186) did not take Spanish in their first 2 years at the University of Florida. The most common first Spanish course varied both by exam level and by student score. The most common first course taken by students who scored a 6 or 7 on either the SL or HL exam was Spanish Language 300: Review of Grammar and Syntax I. Students who scored a 4 or 5 on either level started with a 200-level college Spanish course, and those who scored below a 4 started with a 100-level college Spanish course (Exhibit 9).

Exhibit 10
First College Course Taken, by IB Exam Score: French

IB French exam score	Name of highest frequency first French course	Number of students enrolling in highest frequency first French course	Number of students enrolling in any other first French course	Number of students who did not enroll in a French course in college
IB alumni who did not take IB French exam (N=3979)				
None (Did not take IB exam)	French Language 130: Elementary French I Accelerated	76	16	3887
All IB alumni who took IB French exam (SL or HL) (N=866)				
1-3	French Language 131: Elementary French II Accelerated	8	10	123
4-5	French Language 201: Intermediate Level: General Review of Basic Skills II	40	63	469
6-7	French Language 241: Intermediate French Conversation II	22	36	95
All scores	French Language 241: Intermediate French Conversation II	50	129	687
IB alumni who took SL French exam (N=786)				
1-3	French Language 131: Elementary French II Accelerated	8	10	114
4-5	French Language 201: Intermediate Level: General Review of Basic Skills II	32	56	432
6-7	French Language 241: Intermediate French Conversation II	22	23	89
All scores	French Language 241: Intermediate French Conversation II	46	105	635
IB alumni who took HL French exam (N=80)				
1-3	--	0	0	9
4-5	French Language 201: Intermediate Level: General Review of Basic Skills II	8	7	37
6-7	French Language 300: Grammar and Syntax	8	5	6
All scores	French Language 300: Grammar and Syntax	9	19	52

Only 866 students took an IB French exam, and 687 of them subsequently took no French courses in their first 2 years at the University of Florida. Students who scored a 4 on the French exam earned credit for French 200; those who scored a 5 earned additional credit for French 242; and students who earned a score of 6 or 7 earned credit for French 201 as well. Of the 179 students who took the IB French exam and subsequently enrolled in a French course in their first 2 years of college, the most frequent first French course students took varied by exam level and student score. Note that French Language 241: Intermediate French Conversation II, the highest frequency first college French course taken by students who took the SL exam, is the second semester of a two-semester intermediate French conversation sequence, not a course that precedes French 242 (for which many of these students would have earned credit through their IB exam scores).

Relationship between IB Exam Scores and College Course Performance

Exhibits 11 through 41 illustrate the relationship between how well students performed on IB subject exams and their subsequent performance in the first college course they took in the same subject area. For each of three IB exam score bands—1 through 3, 4 or 5, and 6 or 7—we array the percentage of students who earned an A, B, C, D, or W. In all the subjects we examined, we saw a positive association between IB exam performance and college course grade, with students who scored higher on IB exams earning higher grades in college courses in the same subject area than their peers who had lower scores.

The grade distributions in Exhibits 11 and 12 represent counts of multiple records per student, one for each subject in which a student took an IB exam *and* subsequently took a college course within the first 2 years of college. This means that a student who took the IB English and mathematics exams and went on to take at least one college course in each of these two subjects contributed two records to the analysis (one for each subject). These exhibits give an overall sense of how IB students performed in their first college course given their performance on an IB exam in a corresponding subject area.

Note that in Exhibits 11 through 41 we included only students who took the course for a grade and thus earned an A, B, C, D, or W. We did not include students who took the class pass/fail or received other nonstandard grade awards. In some cases, this means that the number of IB students for a given subject represented in these exhibits is slightly less than the number in Exhibits 4 through 10.

Overall, 59 percent of students who scored a 6 or 7 on an IB exam in one of the focal subjects earned an A in their first course in that subject in college, compared with 39 percent of students who scored a 4 or 5 and 22 percent of students who scored below a 4. Conversely, 47 percent of students who scored below a 4 earned grades of C or lower, compared with 30 percent of students who scored a 4 or 5 and 16 percent of students who earned a 6 or 7 (Exhibit 11). Students who took HL exams did particularly well in their first college courses, with a full 71 percent of HL students who scored a 6 or 7 and 26 percent of those who scored below a 4 earning As. In contrast, 54 percent of students who scored 6 or 7 and 17 percent of those who scored below a 4 on an SL exam earned As in their first college courses in the corresponding subjects (Exhibit 12).

Exhibit 11
First Subject-Specific College Course Grade Distribution for All IB Students, All Focal Subjects

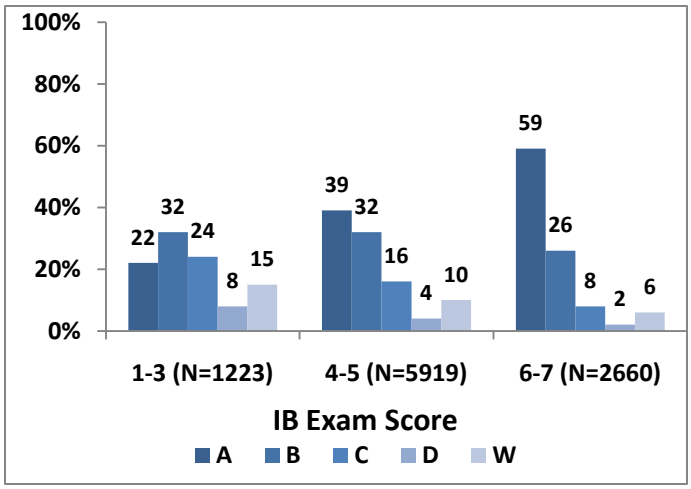
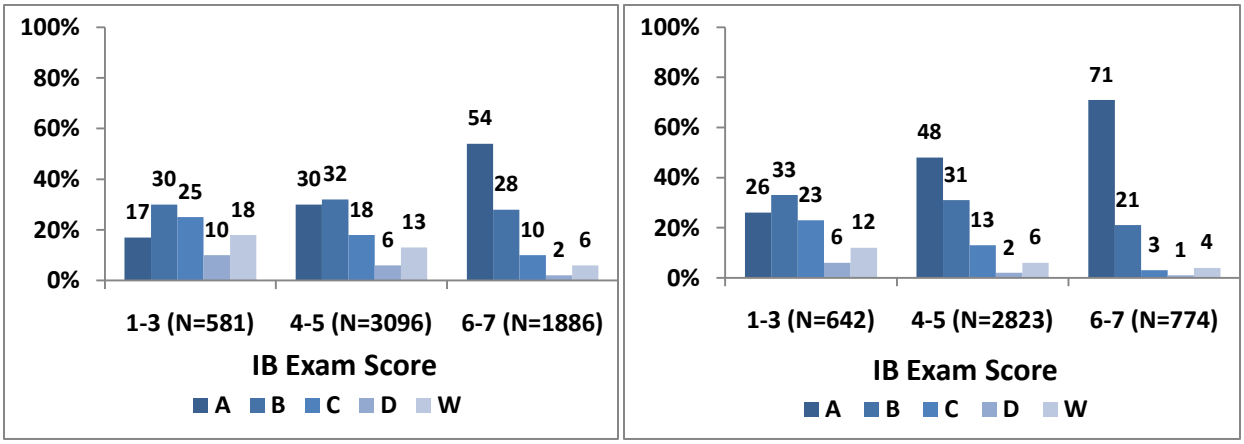


Exhibit 12
First Subject-Specific College Course Grade Distribution for Students Who Took SL Exams (Left) and for Students Who Took HL Exams (Right), All Focal Subjects



College Course Performance by IB Status

In the second set of exhibits, we again pooled student courses across focal subjects, showing their grade distributions broken out by different categories of IB students: diploma recipients and diploma non-recipients (Exhibits 13 through 15) and certificate candidates (Exhibit 16).

The positive association between IB exam score and college grade was less pronounced for diploma non-recipients than for diploma recipients. For students who scored below a 4 on the IB subject exam, the grade distributions for diploma recipients and non-recipients were similar. At higher score levels, the grade distribution shifted upward for diploma recipients, with greater percentages of these students earning As and Bs, but changed less for diploma non-recipients. The grade distribution for the small group of 86 non-recipients who scored a 6 or higher on an IB exam was almost identical to that of both diploma recipients and non-recipients who scored below a 4. This suggests that that the failure to fulfill the diploma requirements may be associated with other factors that interfere with students' course performance, even if those students have adequate or even excellent individual subject-matter preparation.

Exhibit 13
First College Course Grade Distribution for Diploma Recipients and Non-Recipients, All Focal Subjects

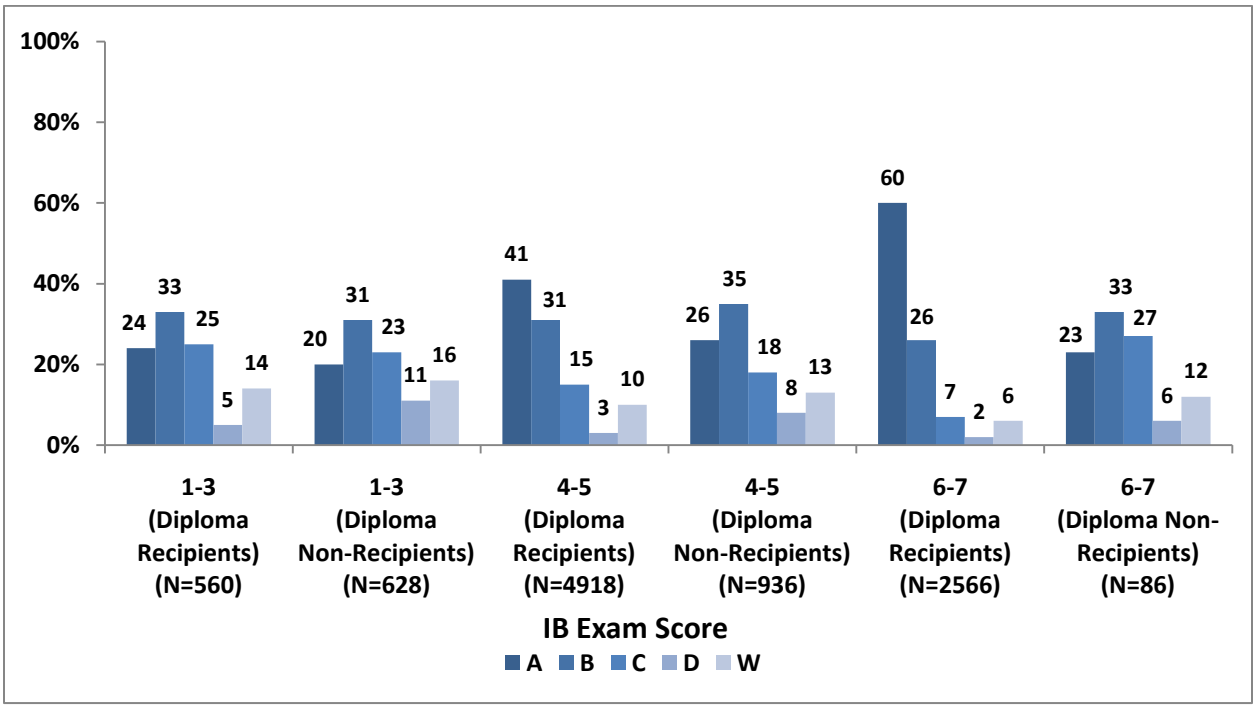


Exhibit 14
First College Course Grade Distribution for Diploma Recipients and Non-Recipients Who Took SL Exams, All Focal Subjects

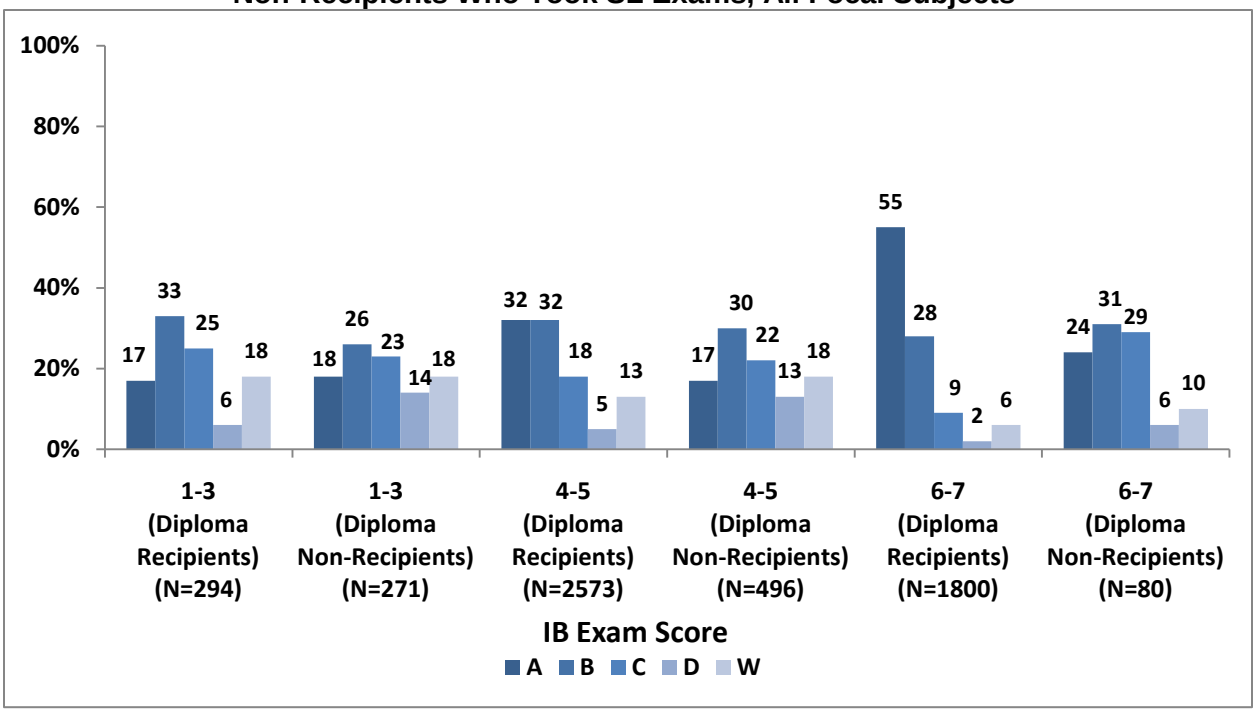


Exhibit 15
First College Course Grade Distribution for Diploma Recipients and Non-Recipients Who Took HL Exams, All Focal Subjects

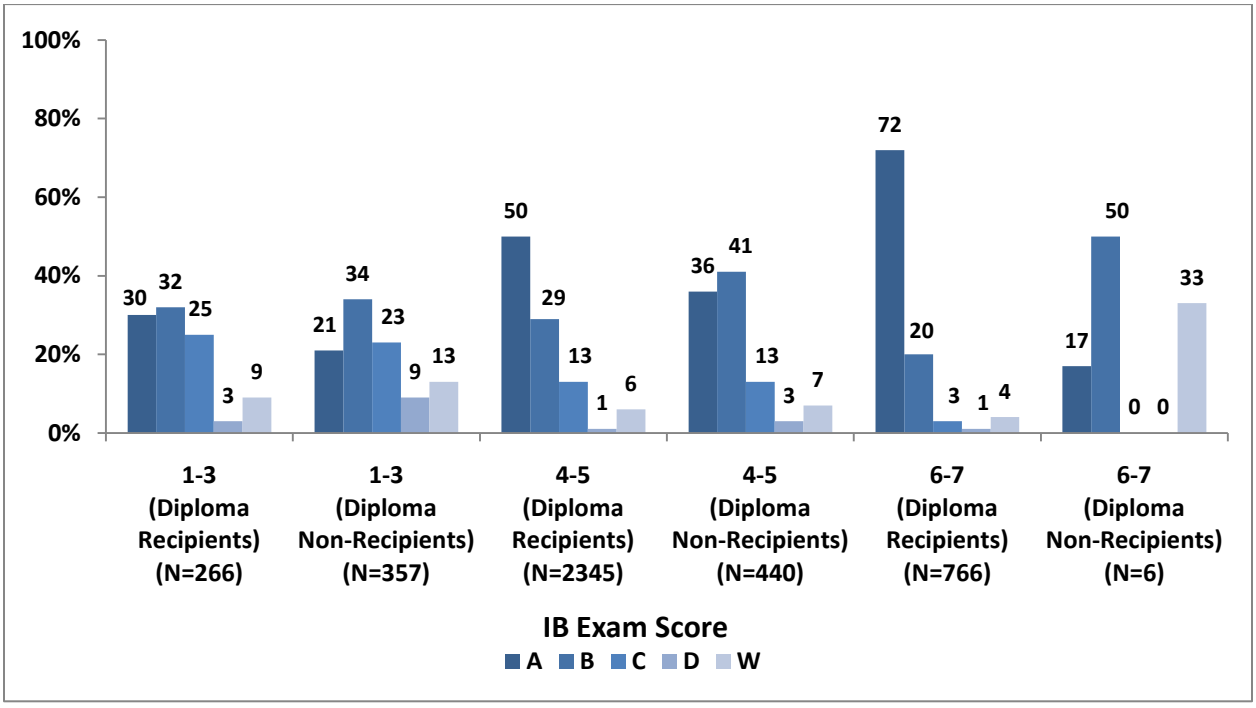
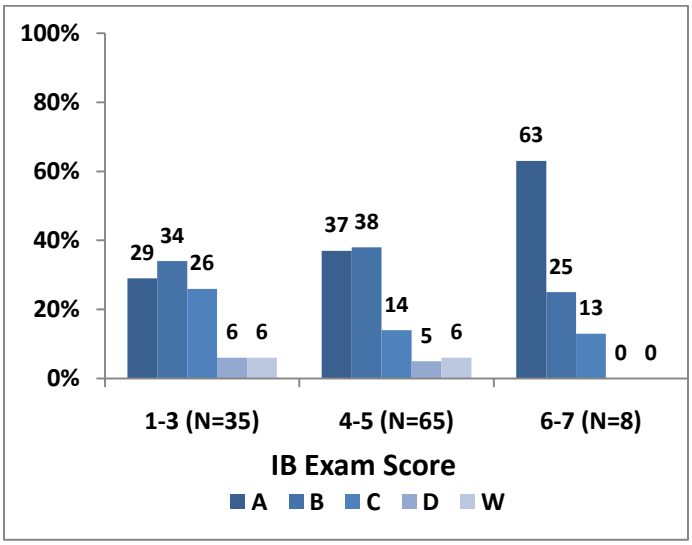


Exhibit 16
First College Course Grade Distribution for Certificate Candidates, All Focal Subjects



College Course Performance by Subject

We also looked at the association between IB exam score and first college course grade within each focal subject and found a similar positive association between IB exam score and college course performance. Exhibits 17 through 41 show the relationship between IB exam performance and first college course grade for particular subjects or groups of subjects—science (physics, chemistry, and biology), mathematics, English, Spanish, and French—and for particular high-frequency courses in these subjects. To better understand the content covered, for each of the highest frequency courses, we include a course description from the University of Florida 2001–02 course bulletin.

Sciences

Exhibit 17, which shows the college grade distribution for students who took IB exams in , biology, chemistry, and/or physics, is again based on counts of students by subject, not counts of individual students (in other words, a student who took IB exams in both physics and biology and then took at least one college course in each of these subjects would be counted twice). Overall, in the sciences, 65 percent of students who scored a 6 or 7 on an IB exam earned an A in the first college course in the corresponding subject, compared with 35 percent of students who scored a 4 or 5 and 20 percent of students who scored below a 4. The contrast between the college grade distribution between students who took SL and HL exams at different score levels was less pronounced in the sciences (Exhibit 18) than across all the focal courses (Exhibit 12). In the sciences, the proportion of students earning As or Bs was similar for students who took the SL and the HL exams and scored a 6 or 7 (84 vs. 89 percent) or who scored a 4 or 5 (65 percent for both). We did see a lower proportion of students who performed poorly (below a 4) on the HL exam earning As compared with those who scored below a 4 on an SL exam (17 vs. 25 percent); the grade distribution for HL exam-takers was shifted slightly toward Cs and Ds, with the proportion of Bs nearly identical across the two exam levels for this score range.

Exhibit 17
Grade Distribution for IB Science Students in All First College Science Courses (Biology, Chemistry, and Physics)

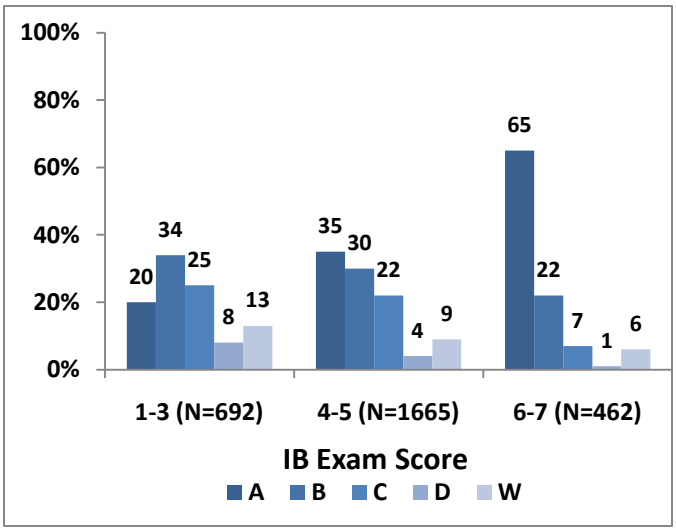
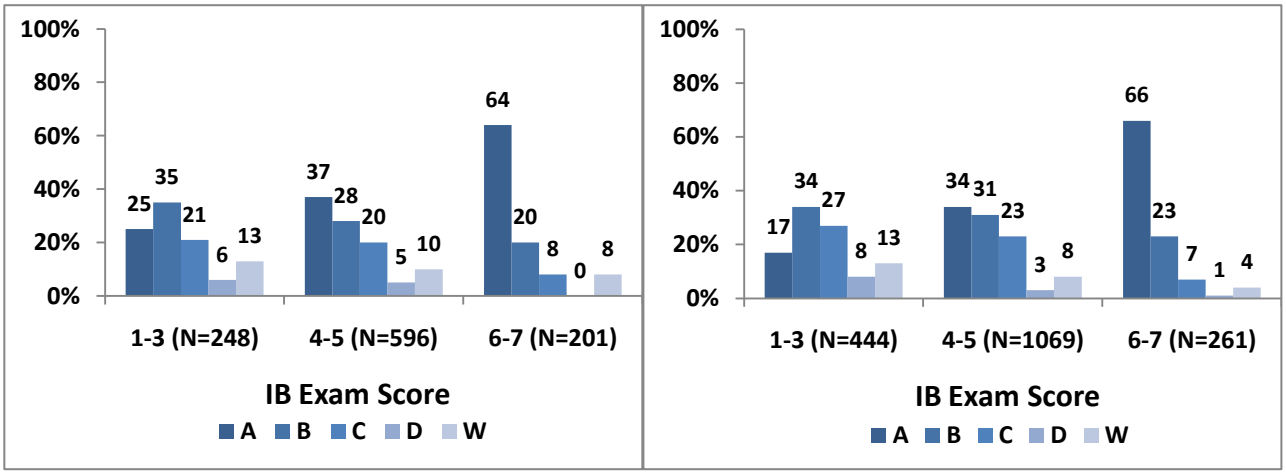


Exhibit 18
Grade Distribution for IB Science SL Students (Left) and for IB Science HL Students (Right) in All First College Science Courses (Biology, Chemistry, and Physics)



Because the highest frequency first course taken by subject varied by how well students performed on the IB subject exam and the level of the exam taken, we also included the grade distribution by IB exam performance for individual high-frequency college courses. We took the most common first courses and displayed the college grade distributions for students who scored in three IB exam score categories, first for all IB students for a subject and then, when the number of students in both exam levels was high enough, broken down by exam level (SL and HL). For the sciences, we included General Physics with Calculus I (Exhibits 19 and 20), General Chemistry I (Exhibits 21 and 22), General Chemistry II (Exhibits 23 and 24), General Biology I (Exhibits 25 and 26), and General Biology II (Exhibits 27 and 28).

The association between IB exam score and college course performance was positive for General Physics with Calculus, both overall and for SL and HL students. The modal grade for students who scored a 6 or 7 on the IB physics exams was A, while C was the most common grade for students who scored below a 4 (except for low-scoring students on the HL exam, who were more likely to earn a B than any other grade).

In General Chemistry I, students in all three IB exam score levels earned As more frequently than any other single grade, although As were far more common for high-scoring students than for low-scoring students. Only students who scored a 4 or above on the IB chemistry exam attempted General Chemistry II as their first chemistry course, and the majority of them earned grades of A or B in the course whether they took the SL or HL exam.

The distribution of grades for General Biology was low compared with that for the other sciences: The most common grade earned by students who scored a 4 or 5 on the IB biology exam, whether SL or HL, was a C. Students who took the IB biology exam and started with General Biology II were more likely to earn a grade of A or B than those who started with General Biology I.

Exhibit 19
IB Physics Scores (SL and HL) and College Course Grades for General Physics with Calculus

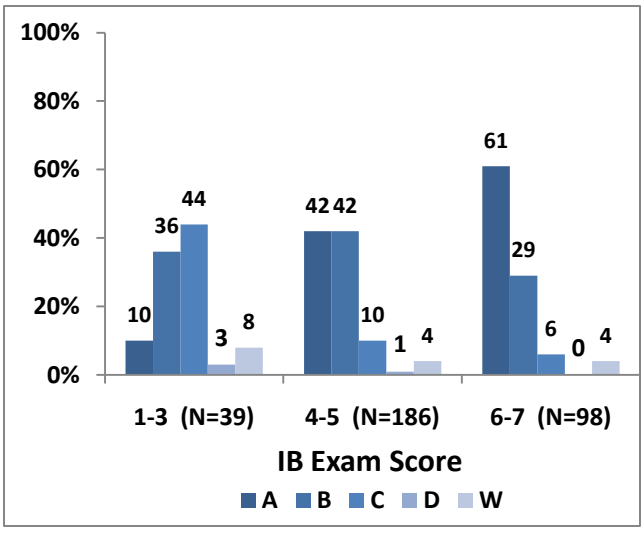
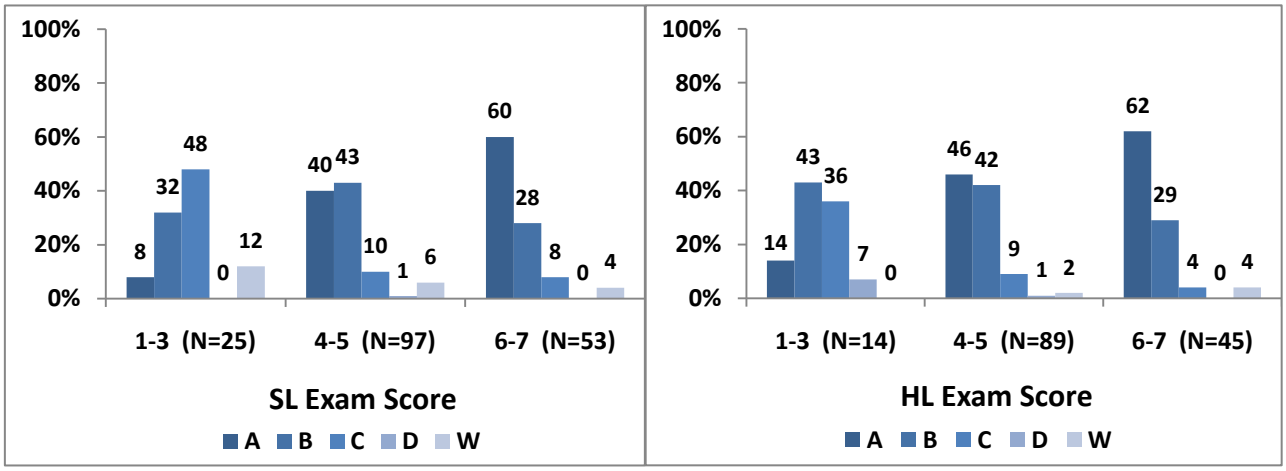


Exhibit 20
SL Physics Scores and College Course Grades for General Physics with Calculus (Left) and HL Physics Scores and College Course Grades for General Physics with Calculus (Right)



Corresponding Course Description from University of Florida 2001-02 Course Bulletin

PHY 2048: Physics with Calculus I. The first of a two-semester sequence of physics for scientists and engineers. The course covers Newtonian mechanics and includes motion, vectors, Newton's laws, work and conservation of energy, systems of particles, collisions, equilibrium, oscillations and waves. One hour per week is devoted to problem solving and discussion. *Credits: 3.*

Prerequisites: High-school physics or PHY 2020 (Introduction to Principles of Physics) or equivalent, and MAC 2311 (Analytic Geometry and Calculus I).

Corequisite: MAC 2312 (Analytic Geometry and Calculus II).

Exhibit 21
IB Chemistry Scores (SL and HL) and College Course Grades for General Chemistry I

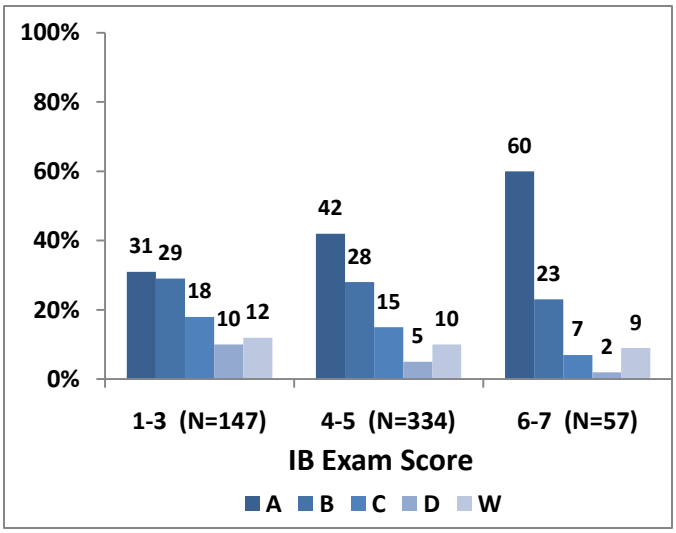
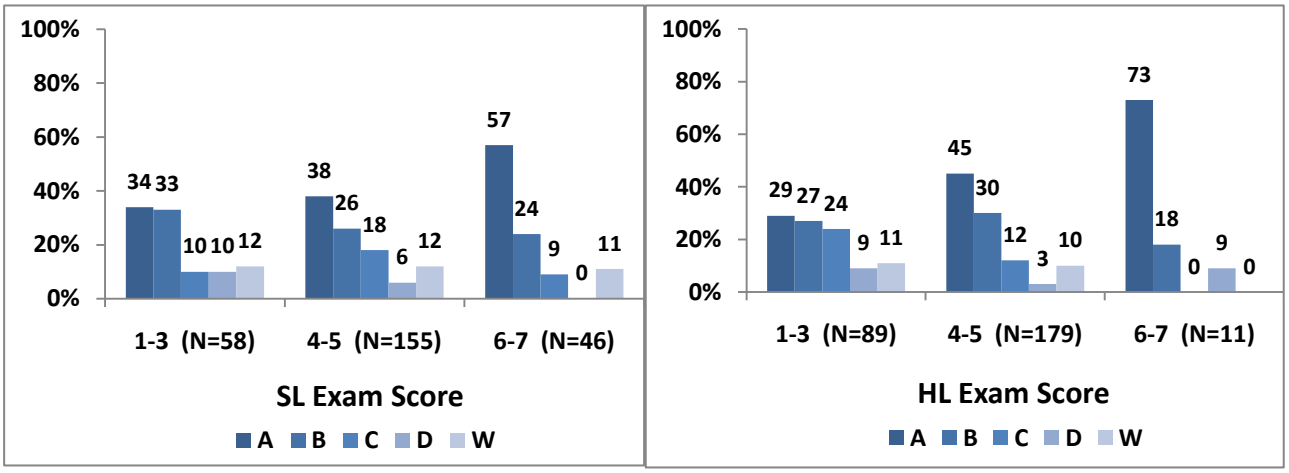


Exhibit 22
SL Chemistry Scores and College Course Grades for General Chemistry I (Left) and HL Chemistry Scores and College Course Grades for General Chemistry I (Right)



Corresponding Course Description from University of Florida 2001–02 Course Bulletin

CHM 2045: General Chemistry. The first semester of the CHM 2045-2045L-2046-2046L sequence (General Chemistry /General Chemistry and Qualitative Analysis, with concurrent lab courses). Stoichiometry, atomic and molecular structure, the states of matter, reaction rates and equilibria, acids and bases. *Credits: 3.*

Prerequisites: MAC 1147 (Precalculus: Algebra and Trigonometry), or its equivalent. The current minimum score on the SATII Chemistry test, an AP minimum score of 3, or an IB minimum score of 4.

Corequisite: CHM 2045L (General Chemistry Laboratory).

Exhibit 23
IB Chemistry Scores (SL and HL) and College Course Grades for General Chemistry II

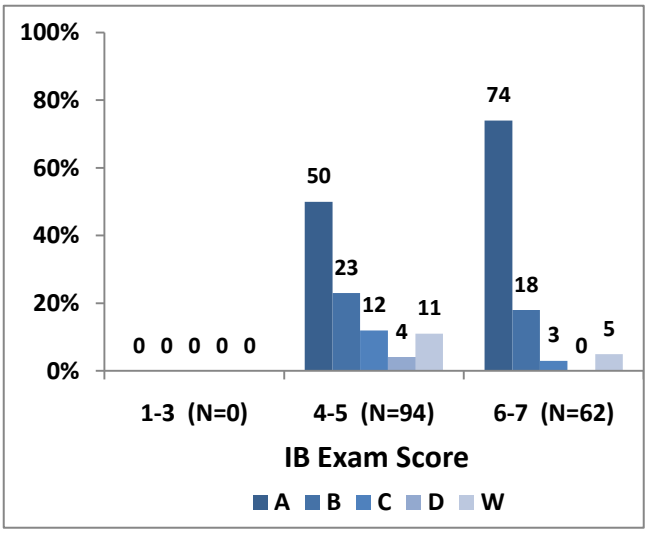
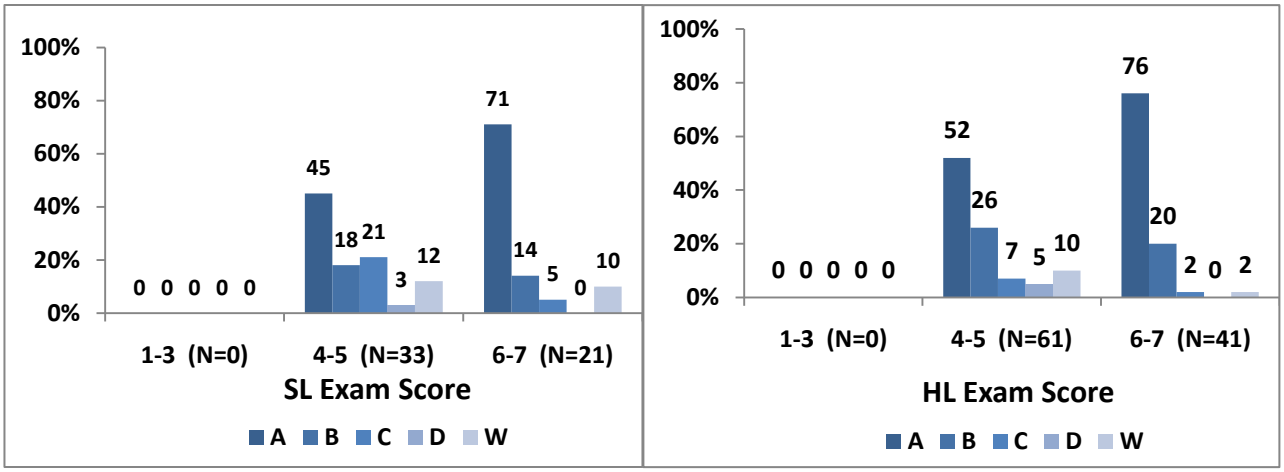


Exhibit 24
SL Chemistry Scores and College Course Grades for General Chemistry II (Left) and HL Chemistry Scores and College Course Grades for General Chemistry II (Right)



Corresponding Course Description from the University of Florida 2001–02 Course Bulletin

CHM 2046: General Chemistry and Qualitative Analysis. Final semester of the CHM 2040-2041-2045L-2046-2046L (Introductory General Chemistry I and II/General Chemistry Laboratory/General Chemistry and Qualitative Analysis + Laboratory) or the CHM 2045-2045L-2046-2046L (General Chemistry + Laboratory/General Chemistry and Qualitative Analysis + Laboratory) sequences. Students who completed CHM 2041 or 2045 or the equivalent at another institution should consult with a chemistry academic adviser before registering for this course. Additional aspects of chemical equilibria, thermodynamics, electrochemistry, complex ions and descriptive chemistry. *Credits: 3.*

Prerequisites: CHM 2041 (second-semester Introductory General Chemistry) or CHM 2045 and CHM 2045L (General Chemistry and General Chemistry Laboratory).

Corequisite: CHM 2046L (General Chemistry and Qualitative Analysis Laboratory).

Exhibit 25
IB Biology Scores (SL and HL) and College Course Grades for General Biology

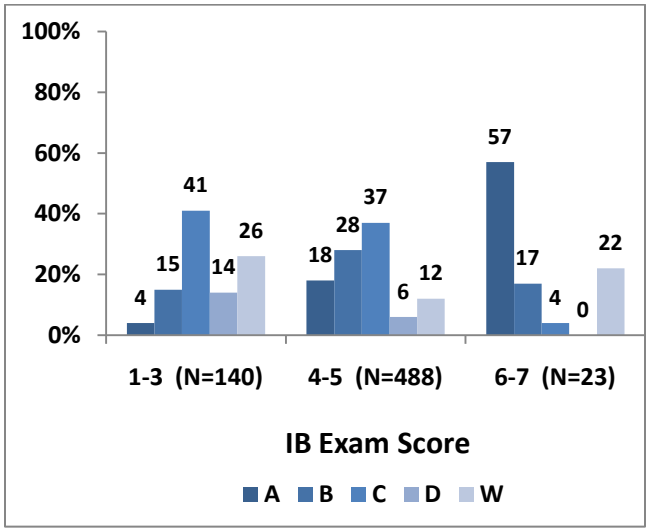
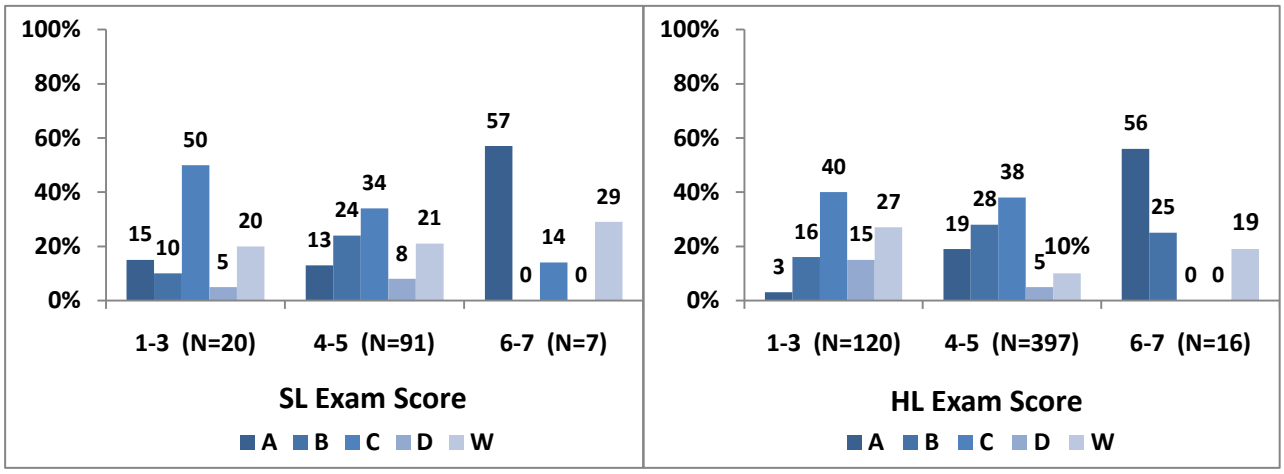


Exhibit 26
SL Biology Scores and College Course Grades for General Biology (Left) and HL Biology Scores and College Course Grades for General Biology (Right)



Corresponding Course Description from the University of Florida 2001–02 Course Bulletin

BSC 2010: Integrated Principles of Biology I. A study of the origin of life systems; of biological molecules, and organization of living things at the subcellular, cellular and organismic levels; and of the activities of living forms in obtaining and utilizing energy and materials in growth, maintenance and reproduction. First semester of the General Biology Core Sequence, which is a two-semester sequence that prepares students for advanced courses in biological sciences and allied fields. *Credits: 3.*

Prerequisites: None.

Corequisites: None.

Exhibit 27
IB Biology Scores (SL and HL) and College Course Grades for General Biology II

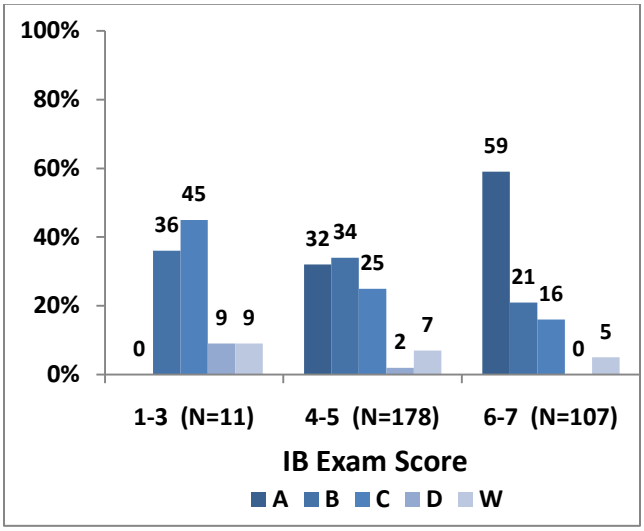
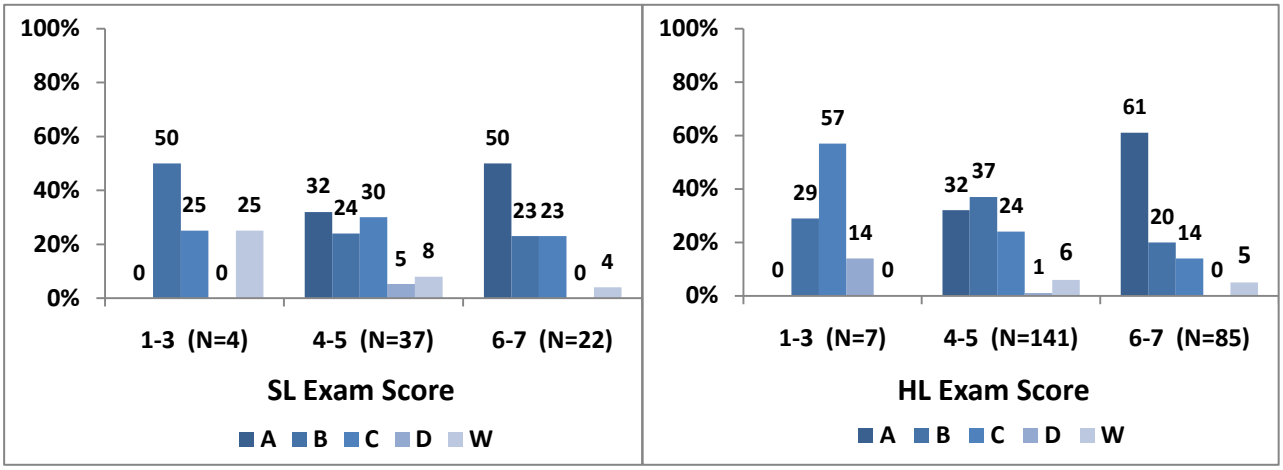


Exhibit 28
SL Biology Scores and College Course Grades for General Biology II (Left) and HL Biology Scores and College Course Grades for General Biology II (Right)



Corresponding Course Description from the University of Florida 2001–02 Course Bulletin

BSC 2011: Integrated Principles of Biology II. An examination in living things of the principles of information storage, transmission and utilization at the levels of the cell, organism and population; of the mechanisms of evolutionary change in the diversification of living things and their life styles; of population growth and regulation; and of energy flow and biogeochemical cycling in the biosphere. Second semester of the General Biology Core Sequence, which is a two-semester sequence that prepares students for advanced courses in biological sciences and allied fields. *Credits: 3.*

Prerequisite: BSC 2010C (Integrated Principles of Biology I).

Corequisites: None.

Mathematics

In mathematics, we saw the same positive association between IB exam scores and college grades (Exhibits 29 through 36). The college grades earned by students who took the HL mathematics exam were particularly high (Exhibit 30). The different course-taking patterns of students who took the HL compared with the SL exam may explain this contrast.

Precalculus Algebra/Trigonometry was the most common first course taken by students who took the SL exam, while more students who took the HL exam took Introduction to Engineering. Students earned lower grades in Precalculus Algebra/Trigonometry: Even for students who scored a 6 or 7 on the IB mathematics exam, B was the most common grade (Exhibit 31). In contrast, more than 80 percent of students earned As in Introduction to Engineering, regardless of score band or test level (Exhibit 32). Although the grade distribution in Introduction to Engineering was slightly higher for HL compared with SL students (Exhibit 33), a much higher proportion of HL students took Introduction to Engineering than SL students: 25 compared with 9 percent (Exhibit 7). The high grades earned overall in college mathematics courses by HL students probably reflect the high grade distribution for this course. The small number of students who took the HL exam in mathematics and enrolled in Statistical Methods 1 as their first college mathematics course earned very high grades in this course, regardless of score band (Exhibit 36).

Exhibit 29
Grade Distribution for IB Mathematics Students in All First College Mathematics Courses

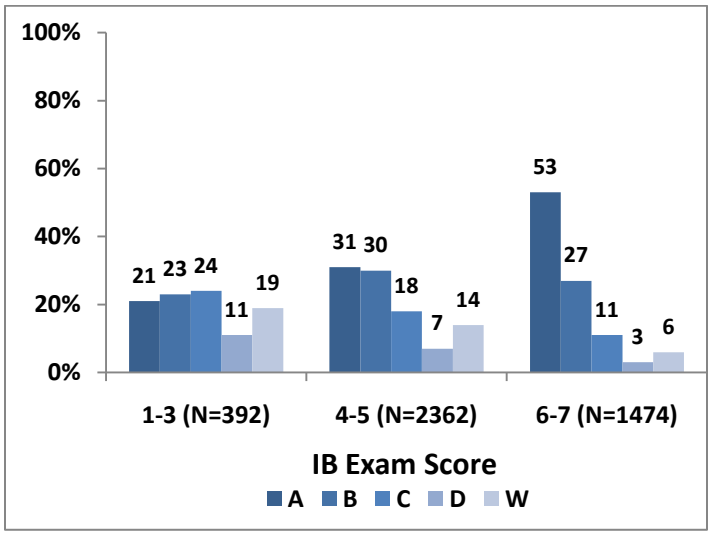


Exhibit 30
Grade Distribution for
SL Mathematics Students in All First College Mathematics Courses (Left)
and for HL Mathematics Students in All First College Mathematics Courses (Right)

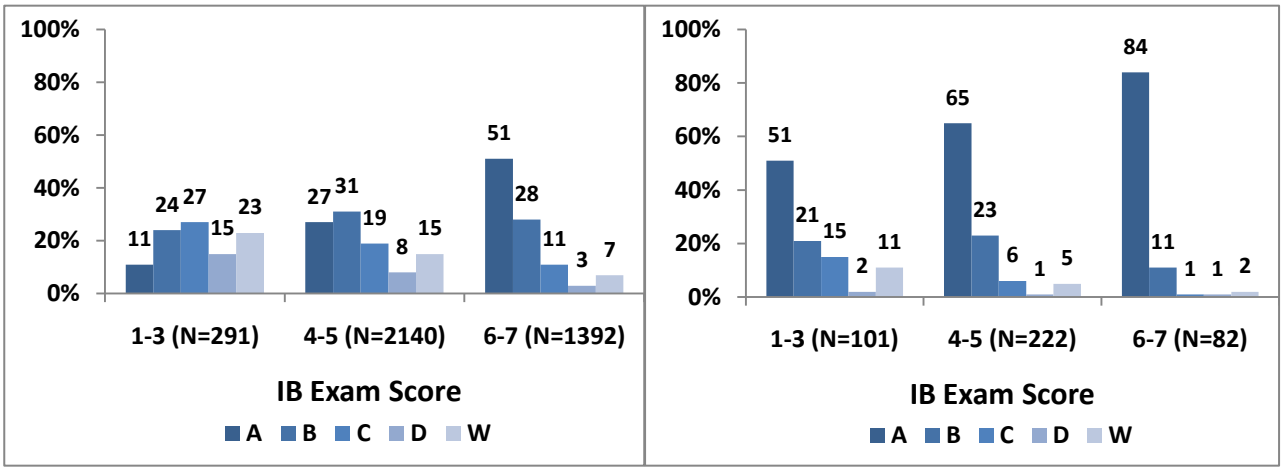
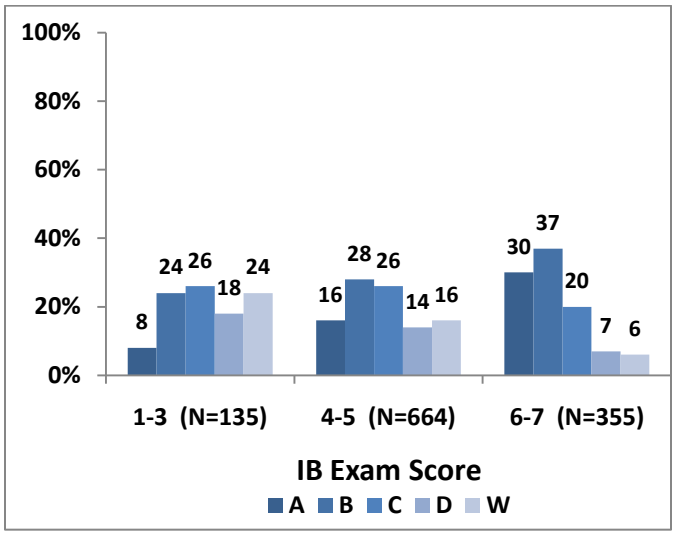


Exhibit 31
IB Mathematics Scores (SL and HL) and College Course Grades for Precalculus Algebra/Trigonometry



Note: We omitted graphs breaking down SL and HL enrollment for Precalculus Algebra/Trigonometry because total enrollment by HL alumni was only 9.

Corresponding Course Description from the University of Florida 2001–02 Course Bulletin

MAC 1147: Precalculus: Algebra and Trigonometry. College algebra, functions, coordinate geometry, exponential and logarithmic functions, and trigonometry. This fast-paced course is designed as a review of algebra and trigonometry to prepare the student for calculus. *Credits: 4.*

Prerequisites: This course assumes prior knowledge of intermediate algebra (Algebra II).

Corequisites: None.

Exhibit 32
IB Mathematics Scores (SL and HL) and College Course Grades for Introduction to Engineering

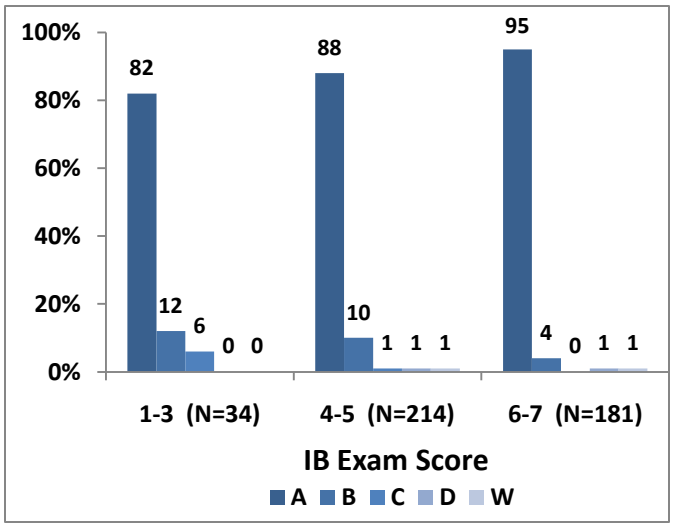
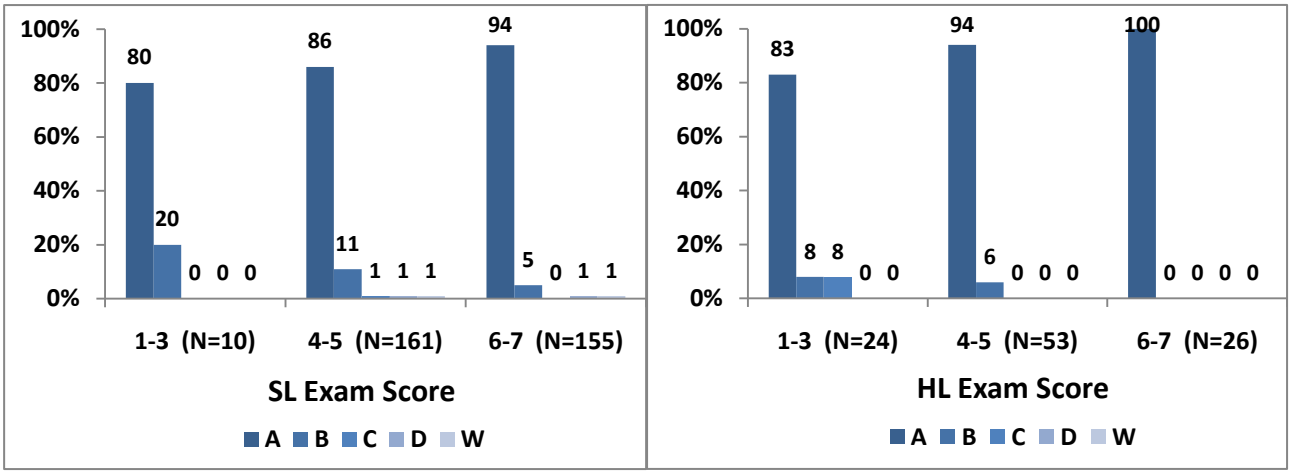
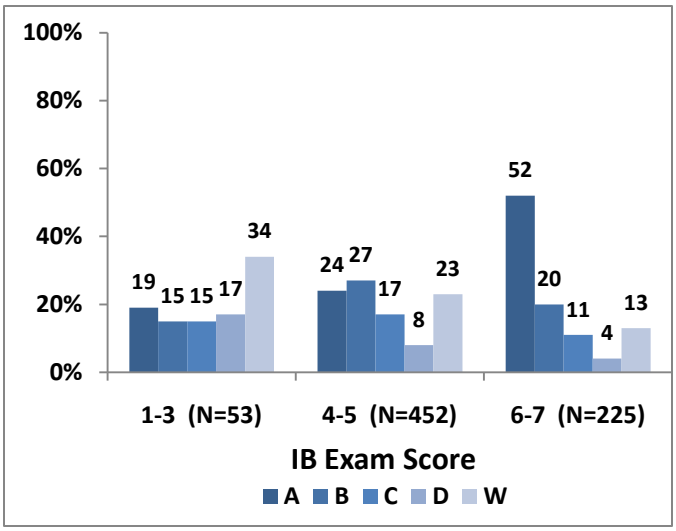


Exhibit 33
SL Mathematics Scores and College Course Grades for Introduction to Engineering (Left) and HL Mathematics Scores and College Course Grades for Introduction to Engineering (Right)



No corresponding course description was available from the University of Florida 2001–02 course bulletin.

Exhibit 34
IB Mathematics Scores (SL and HL) and College Course Grades for Calculus I



Note: We omitted graphs breaking down SL and HL enrollment for Calculus I because total enrollment by HL alumni was only 43.

Corresponding Course Description from the University of Florida 2001–02 Course Bulletin

MAC 2311: Analytic Geometry and Calculus 1. Introduction to analytic geometry; limits; continuity; differentiation of algebraic and trigonometric functions, differentials; introduction to integration and the fundamental theorem of calculus. *Credits: 4.*

Prerequisite: Strong background in precalculus.

Corequisites: None.

Exhibit 35
IB Mathematics Scores (SL and HL) and College Course Grades for Statistical Methods I

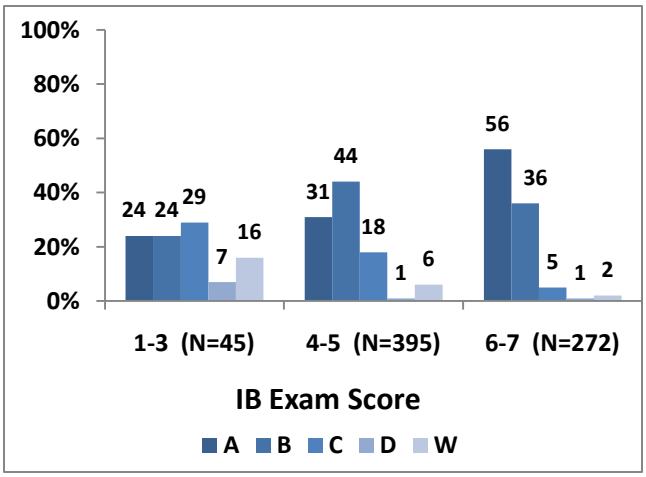
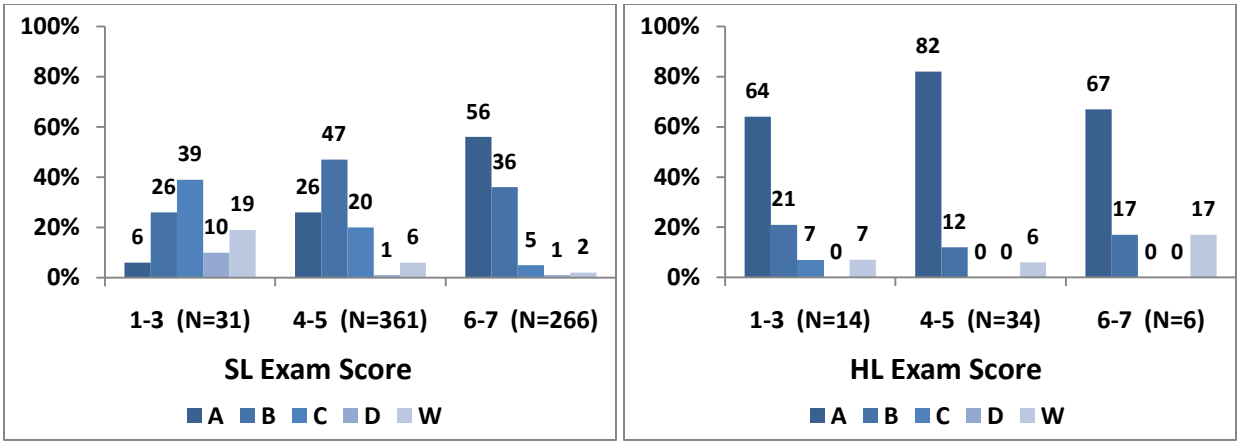


Exhibit 36
SL Mathematics Scores and College Course Grades for Statistical Methods I (Left) and HL Mathematics Scores and College Course Grades for Statistical Methods I (Right)



Corresponding Course Description from the University of Florida 2001–02 Course Bulletin

STA 2023: Introduction to Statistics 1. Graphical and numerical descriptive measures, probability, conditional probability, probability laws, discrete random variables, binomial and normal random variables, sampling distributions, central limit theorem, large and small sample confidence intervals for parameters associated with a single population and for comparison of two populations. Hypothesis testing for large and small samples. *Credits: 3.*

Prerequisites: None.

Corequisites: None.

English

Exhibits 37 through 39 show the college grade distributions of students who took the IB English exam, overall and for students whose first college English course was Freshman Composition Skills I or Technical Writing, two of the highest frequency first college courses taken by IB students. Because almost all students (96 percent) who took the IB English exam took the HL version, we do not include breakouts by IB exam level (SL compared with HL).

In Exhibit 37, we see that IB students earned high grades in their first English course in college regardless of score band: 93 percent of students who scored 6 or 7, 87 percent of students who earned a 4 or 5, and 79 percent of those who earned a 3 or lower on the exam had an A or a B in their first college English course. Similarly high percentages of IB students earned As and Bs in Freshman Composition Skills I: 81 percent of student who scored a 4 or 5 and 78 percent of students who scored below a 4 (Exhibit 38; note that no students who scored a 6 or 7 enrolled in English Composition I as their first college English course). The grade distribution for IB students who enrolled in Technical Writing as their first college English course mirrored that of IB students in all first college English courses, except that a higher percentage of students in the lowest IB score band (1 through 3) earned an A in this course than students overall in their first English courses (60 compared with 38 percent, Exhibit 39).

Exhibit 37
Grade Distribution for IB English Students in All First College English Courses

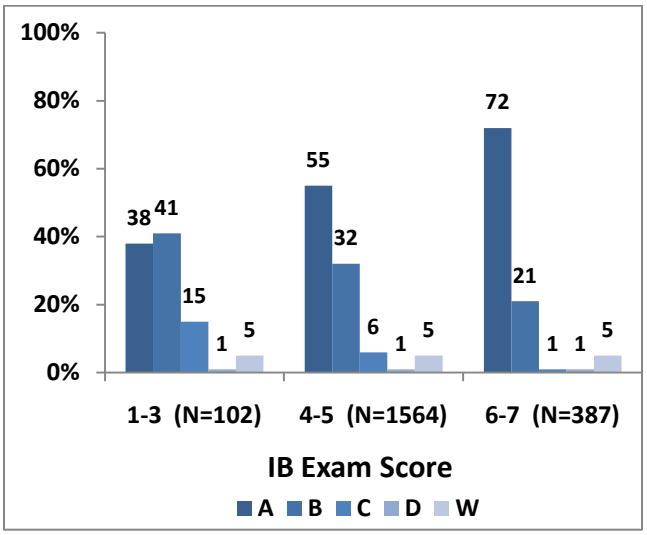
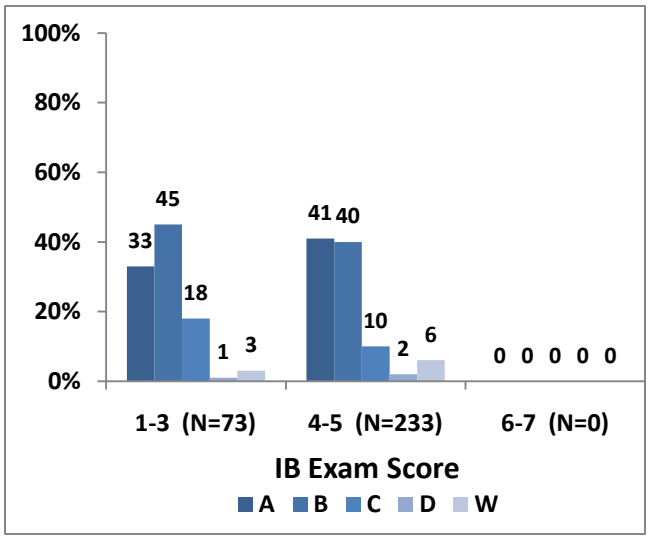


Exhibit 38
IB English Scores (SL and HL) and College Course Grades for Freshman Composition Skills I



Note: We omitted graphs breaking down SL and HL enrollment for Freshman Composition Skills because total enrollment by SL alumni was only 8.

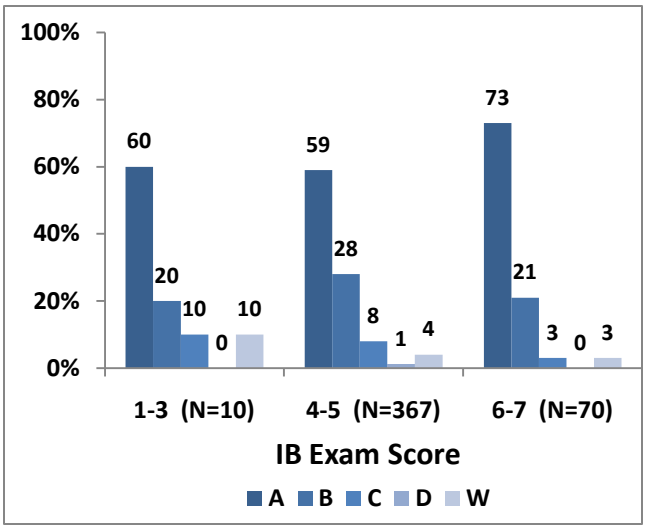
Corresponding Course Description from the University of Florida 2001–02 Course Bulletin

ENC 1101: Expository and Argumentative Writing. This course prepares students to write expository-argumentative prose and to analyze discourse in contemporary culture. ENC 1101 is designed to help students improve their grasp of standard written English, library research, critical analysis and creative thinking. *Credits: 3.*

Prerequisites: None.

Corequisites: None.

Exhibit 39
IB English Scores (SL and HL) and College Course Grades for Technical Writing



Note: We omitted graphs breaking down SL and HL enrollment for Technical Writing because total enrollment by SL alumni was only 25.

Corresponding Course Description from the University of Florida 2001–02 Course Bulletin

ENC 2210: Technical Writing. A survey of the forms and methods of communication used in business, industry and government, including nonformal and formal reports, letters, resumes and proposals. *Credits: 3*

Prerequisite: ENC 1101 (Expository and Argumentative Writing) or test score equivalency.

Corequisites: None.

Foreign Languages

Because of the small numbers of IB students who took Spanish or French in college, we do not show any breakouts by individual course in these subjects. Exhibits 40 and 41 display the grade distribution for students' first college courses in Spanish and in French. Only 20 IB students who scored below a 4 went on to take Spanish at the University of Florida, and they earned lower grades than students who scored a 6 or 7 (Exhibit 40). We saw a very similar grade distribution for students' first French courses, with a slightly higher percentage of As and Bs earned by students in each IB exam score band, (Exhibit 41).

Exhibit 40
Grade Distribution for IB Spanish Students
in All First College Spanish Courses

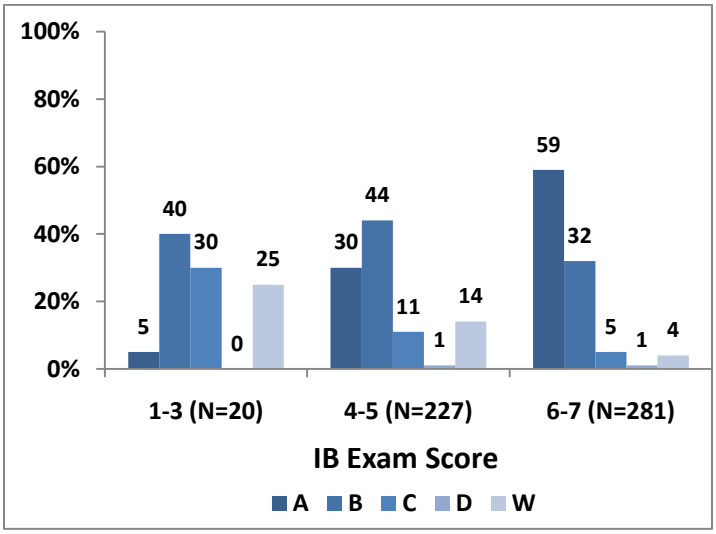


Exhibit 41
Grade Distribution for IB French Students
in All First College French Courses