

THE ADVANCED PLACEMENT[®] PROGRAM AND UW-MADISON NEW FRESHMEN

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INTRODUCTION

For almost twenty years, UW-Madison has awarded elective or course credit for demonstrated proficiency in college-level high school courses. One method of demonstrating proficiency is through the College Board's Advanced Placement[®] (AP) exams. Students who demonstrate a specified level of proficiency receive credit for the corresponding UW-Madison course. This enables students to fulfill graduation requirements and to start intermediate or advanced courses sooner. Sixty-five percent of UW-Madison new freshmen now receive UW-Madison credit for scores on at least one AP exam.

One goal of the Madison Initiative for Undergraduates¹ is improving access to high-demand courses. Many of these "high demand" courses at UW-Madison can also be completed based on high achievement on the corresponding AP examination. By fully leveraging the AP preparation that many of our students already bring to UW-Madison, we can improve access to high-demand courses for non-AP students because the AP students will not be retaking courses that they already had in high school. Numerous studies, conducted by The College Board and other universities, show that AP students do at least as well in subsequent courses compared to students who took the course in college². In this analysis, we investigate whether this is also true at UW-Madison so that we can substantiate and increase our confidence in the AP program and its contribution to the academic preparation of UW-Madison first-year students.

SUMMARY OF KEY FINDINGS

1. Two of three UW-Madison new freshmen receive UW-Madison course or elective credit based on the results of their scores on Advanced Placement examinations. Of the 37 AP exams that are currently available, 14 of them are each taken by at least 5% of UW-Madison new freshmen.
2. Many AP students take subsequent courses at UW-Madison in curricular areas related to their AP credit. This enables us to compare the final grades of AP credit students in these subsequent courses to the final grades of non-AP credit students to evaluate whether there is evidence that the AP course is adequate preparation. In this analysis, we compare the percentage of students who receive a final grade of A as well as the percentage who receive a C or better.
3. We are able to identify at least one subsequent course for 12 of the 14 commonly-taken AP exams. In each subsequent course, the proportion of AP students who receive a C or better is the same or greater than the proportion of "C or better" grades for students who take the corresponding course at UW-Madison.
4. In many cases, a higher proportion of AP students get As in the subsequent course compared to students who take the corresponding course at UW-Madison.
5. Based on this methodology, there is ample evidence to conclude that our current AP course equivalencies are appropriate.
6. We identify potential opportunities to better leverage the AP program in two high-demand course areas. We suggest that the faculty responsible for these curricular areas review this analysis and consider whether expanding the UW-Madison equivalencies awarded for AP scores is appropriate.

ABOUT ADVANCED PLACEMENT[®] (AP)

The College Board's Advanced Placement (AP) program is based on the premise that college-level material can be taught successfully to well-prepared high school students³. The AP curriculum consists of college-level courses taught by high school teachers to high-school students.

AP Courses

AP courses are modeled after and are designed to correspond to courses offered at most colleges and universities using a curriculum developed by a committee of experienced teachers and college faculty. There are currently 37 different AP courses in a wide variety of subject areas.

AP Exams and Scoring

Comprehensive examinations for each AP course are administered on a common date nationally each May⁴. Examinations are scored by experienced AP teachers and college faculty using standards developed by the committee that developed the course curriculum. Exams consist of both multiple choice questions and a free-response section. All exams are scored on a five-point scale⁵ with a score of 5 considered "extremely well qualified", comparable to an A grade in the corresponding college course.

UW System and UW-Madison Policy

The American Council on Education (ACE), the major coordinating body for higher education in the United States, recommends that college credit be given for AP scores of 3 and above⁶. In 1991, the UW System Board of Regents adopted a policy requiring the awarding of degree credit for AP scores of 3, 4 and 5.

At UW-Madison, students with scores of 3 on AP exams usually receive elective credit. Students with scores of 4 or 5 usually receive credit for the corresponding UW-Madison course(s)⁷. The Office of Undergraduate Admissions consults with academic departments to determine the most appropriate credit equivalencies for AP exam scores

The goal of the credit equivalency determination is to award “appropriate” UW-Madison credit for AP scores. By appropriate, we mean credit that acknowledges the AP preparation without making students retake material they have already mastered. Appropriate also means ensuring that the AP equivalency does not disadvantage students by placing them at a level beyond their preparation, thus increasing the potential for a non-successful outcome in subsequent courses

Keep in mind that we are not analyzing differences that exist among the *students* who take advanced high school courses or the availability (or lack thereof) of AP and other advanced courses in high school. This is only an analysis of the current AP credit equivalencies.

AP AND UW-MADISON

At UW-Madison, we do not always give consistent messages to our students regarding AP. On one end, at the “front door” to UW-Madison, Undergraduate Admissions routinely emphasizes the importance of AP (as well as the International Baccalaureate diploma program) to high school principals, counselors and prospective students. Like other selective universities, UW-Madison admits students who challenge themselves within the course array offered by their high schools. Students who take AP classes when they are available at their high schools demonstrate evidence of academic motivation and engagement.

After interacting with Undergraduate Admissions, where the benefit of AP and other indicators of academic motivation and engagement is emphasized, enrolled students sometimes encounter UW-Madison faculty and staff who disparage the AP program and exams. When students and their families encounter these mixed messages, they question the value of their hard work in high school and experience apprehension about their academic preparation for UW-Madison. Some students are advised to, and do, retake courses for which they have already received credit.

Two previous studies conducted by Academic Planning and Analysis examined course grades in upper level math courses for students who took the AP Calculus AB exam and students who took the corresponding course (Math 221) at UW-Madison⁸. Both studies found that the AP students had grades that matched or exceeded other students. In this analysis, we broaden our scope of inquiry to include other AP subjects.

Over the past five years, UW-Madison students have submitted scores for each of the 37 existing AP examinations, although some exams are taken by very few students (see Appendix A for a full listing). The following AP examinations, taken by at least 5% of the incoming freshman class annually, are the focus of this analysis: Biology, Calculus AB, Calculus BC, Chemistry, English Language, English Literature, European History, Macroeconomics, Microeconomics, Physics B, Psychology, Statistics, U.S. Government & Politics, and U.S. History.

Table 1 summarizes the UW-Madison course or elective credit given for the AP exams that are taken by at least 5% of UW-Madison freshmen. Elective credit is used when a departmental faculty deem that the AP curriculum and/or AP score is not equivalent to any existing course.

Table 1
AP Scores and UW-Madison Course or Elective Credit Equivalencies

AP Exam (Score)	UW-Madison Credit		
	Type	Course/Gen Ed.	#
Biology (4-5)	Elective	Bio. sci. (breadth)	5
Calculus AB (4-5)	Course	Math 221	5
Calculus BC (3-5)	Course	Math 221 & 222	10
Chemistry (4-5)	Course	Chemistry 103	3
English Lang. (4-5)	Elective	Com A (gen ed)	3
English Literature (4-5)	Elective	Com A (gen ed) Literature (breadth)	3
European History (4-5)	Course	History 119 & 120	6
Macroeconomics (4-5)	Course	Economics 102	4
Microeconomics (4-5)	Course	Economics 101	4
Physics B (4-5)	Course	Physics 103 & 104	8
Psychology (4-5)	Course	Psychology 202	3
Statistics (4-5)	Course	Statistics 301	3
U.S. Government (4-5)	Course	Political Sci. 104	4
U.S. History (4-5)	Course	History 101 & 102	6

METHODOLOGY

In this analysis, we examine whether students with AP credit are as successful in subsequent courses compared to students who take the course prerequisite at UW-Madison. **Example, do students who receive credit for Chemistry 103 based on AP exam scores perform as well in Chemistry 104 (which has Chemistry 103 as a prerequisite) compared to students who take Chemistry 103 at UW-Madison?**

Table 2 shows the steps that determined the two populations of students that we compare in this analysis. In Step 1, we identify students who entered UW-Madison as new freshmen between 2004 and 2008 (total 29,196 students). We limit the analytic population to students who enrolled during the same year they graduated from high school in order to minimize the chance that any difference in course grades is due to recency of exposure to the academic subject⁹.

In Step 2, we identify the new freshmen from Step 1 who took AP exams. In order to have enough cases for meaningful analysis, we limit the analysis to the AP examinations that result in UW-Madison credits for at least 5% of new freshmen. We further limit the population to students who scored high enough on the AP examination to receive UW-Madison course credit (usually scores of 4 or 5). **Example: new freshmen who took the AP Chemistry exam and scored a 4 or 5.**

In Step 3, we identify the non-AP-credit students who take the UW-Madison course for which the other students receive AP credit. We remove the AP students who could have received credit based on their AP score but took the course anyhow. **Example: new freshmen who did not take the AP exam and took Chemistry 103 at UW-Madison.**

In Step 4, we identify the students from both groups who take a subsequent course that requires the course in Step 3 as a prerequisite. For two of the AP exams, Physics B and Statistics, we are not able to identify any subsequent course that these students commonly take that is related to the content of the AP course. **Example: students who took Chemistry 104 at UW-Madison who had either previously taken Chemistry 103 at UW-Madison or who received course credit for Chemistry 103 based on their AP exam score.**

In Step 5, we analyze final course grades for each course in Step 4 by comparing the AP-credit students to the comparison group (student who took the course at UW-Madison). There are many possible measures of subsequent course outcomes; for this analysis, we compare:

- the percentage of students in each group who get an A as a final grade, as a measure of exemplary performance, and

- the percentage of students in each group who get a C or better, as a measure of successful course completion.

To compare final course grades, we use a chi-square test to evaluate whether differences in the proportion of students who earned grades at the specified level is significant or if there is a high probability that any observed difference is simply due to chance. If the students with prerequisite course credit based on AP exam scores do as well in the subsequent course as students who take the prerequisite course at UW-Madison, then that is evidence that our current AP credit course credits are appropriate¹⁰. **Example: Does the percentage of students who got at least a C in Chemistry 104 differ based on how they completed Chemistry 103?**

Table 2
Selection of AP Group and Comparison Group

Analytic Steps	AP Group	Comparison Group
1. Entered UW-Madison as a new freshman?	Yes	Yes
2. Took specified AP exam?	Yes	No
3. Took prerequisite course at UW-Madison?	No	Yes
4. Took subsequent course at UW-Madison?	Yes	Yes
5a. Had exemplary course outcome?	% A ↔ % A	
5b. Had successful course outcome?	% C or better ↔ % C or better	

MATHEMATICS

The two AP math courses, Calculus AB and Calculus BC, are intended for high school students with previously demonstrated mastery of material equivalent to four full years of high school math. Twenty-one percent (21%) of UW-Madison freshmen take the Calculus AB exam and 10% take the Calculus BC exam.

Calculus AB

Students who receive a 4 or 5 on the AP Calculus AB examination get five credits for Math 221 (Calculus and Analytic Geometry), the first semester of the calculus sequence. Many of these students subsequently take Math 222, the second semester of the calculus sequence which has a prerequisite of Math 221.

Table 3 shows the proportion of students in each group who got an A in Math 222 and the proportion of who got a C or better. The AP-credit students at both score levels are more likely to receive As and more likely to receive Cs or better compared to the students who take Math 221 at UW-Madison. This evidence supports the continued awarding of credit for Math 221 for students with 4s and 5s on the AP Calculus AB exam.

Table 3
Math 222 Final Course Grades
by Prerequisite Completion Method

	AP Calculus AB Group		Comparison Group
	Score 4	Score 5	Math 221
Students	562	597	2,593
Math 222 GPA	3.11	3.40	2.86
% As	29	47	21
% C or better	97	99	94

*Percentages in bold indicate grades for the AP students that are significantly different from the grades of the comparison group based on a Chi-square test (95% confidence interval).

Calculus BC

Students who receive a 3, 4 or 5 on the AP Calculus BC examination get ten credits total for Math 221 and Math 222 (Calculus and Analytic Geometry), the first two semesters of the UW-Madison calculus sequence. Many of these students subsequently take higher-level math and engineering courses requiring prior completion of second semester calculus. Commonly taken subsequent courses include Math 234 (Calculus-Functions of Several Variables), Math 320 (Linear Algebra and Differential Equations), and Engineering Mechanics and Astronautics 201 (Statics).

Students with AP credit based on scores of 3, 4 and 5 on the AP Calculus BC exam are equally (scores of 3 and 4) or more (score of 5) likely to get at least a C in Math 234 compared to students who take Math 222 at UW-Madison (Table 4). Students with AP credit based on exam scores of 3 and 4 are less likely to get As in Math 234 compared to non-AP credit students who take Math 222 at UW-Madison. Students with AP credit based on exam scores of 5 are more likely to get As in Math 234 compared to students who take Math 222 at UW-Madison.

Table 4
Math 234 Final Course Grades
by Prerequisite Completion Method

	AP Calculus BC Group			Comparison Group
	Score 3	Score 4	Score 5	Math 222
Students	145	244	584	2,737
Math 234 GPA	2.57	2.60	3.27	2.81
% As	12	13	42	22
% C or better	87	87	96	86

*Percentages in bold indicate grades for the AP students that are significantly different from the grades of the comparison group based on a Chi-square test (95% confidence interval).

In Math 320, students with AP credit based on scores of 3 and 4 on the AP Calculus BC exam are equally likely to earn As and Cs or better compared to students who take Math 222 at UW-Madison (Table 5). Students with AP credit based on scores of 5 on the Calculus BC exam are more likely to earn As and Cs or better compared to students who take Math 222 at UW-Madison.

Table 5
Math 320 Final Course Grades
by Prerequisite Completion Method

	AP Calculus BC Group			Comparison Group
	Score 3	Score 4	Score 5	Math 222
Students	42	90	213	1,049
Math 320 GPA	2.74	2.55	3.22	2.83
% As	12	12	33	21
% C or better	88	87	97	91

*Percentages in bold indicate grades for the AP students that are significantly different from the grades of the comparison group based on a Chi-square test (95% confidence interval).

In Engineering Mechanics 201, students with AP credit based on scores of 3 and 4 on the AP Calculus BC exam are similar to the UW-Madison Math 222 students in terms of the proportion who receive As and the proportion who receive a C or better (Table 6). Students with AP credit based on scores of 5 on the AP Calculus BC exam are more likely to receive As and more likely to receive a C or better in Math 234 compared to students who take Math 222 at UW-Madison.

Table 6
Engineering Mechanics 201 Final Course Grades
by Prerequisite Completion Method

	AP Calculus BC Group			Comparison Group
	Score 3	Score 4	Score 5	Math 222
Students	62	90	226	1,333
EMA 201 GPA	2.74	2.75	3.15	2.75
% As	15	18	29	17
% C or better	94	93	96	92

*Percentages in bold indicate grades for the AP students that are significantly different from the grades of the comparison group based on a Chi-square test (95% confidence interval).

This evidence supports the continued awarding of credit for Math 221 and 222 for scores of 3 or more on the AP Calculus BC exam.

CHEMISTRY

The Advanced Placement Chemistry course is designed to be taken after completion of a first course in high school chemistry and is designed to be equivalent to a typical first-year general chemistry college course. Eight percent (8%) of UW-Madison new freshmen take the AP Chemistry exam.

Students who receive a 4 or 5 on the AP Chemistry exam receive 3 credits for Chemistry 103 (General Chemistry). Some subsequently take Chemistry 104, the second semester of General Chemistry.

Compared to the non-AP credit students who take Chemistry 103 at UW-Madison, a higher proportion of students who receive AP credit for Chemistry 103 get As in Chemistry 104 (Table 7). Students who receive credit for Chemistry 103 based on scores of 4 or 5 on the AP Chemistry exam are either equally (score of 5) or more (score of 4) likely to receive at least a C in Chemistry 104 compared to students who did not take the AP Chemistry exam and take Chemistry 103 at UW-Madison.

This evidence supports the continued awarding of credit for Chemistry 103 for students with 4 and 5 on the AP Chemistry exam.

Table 7
Chemistry 104 Final Course Grades
by Prerequisite Completion Method

	AP Chemistry Group		Comparison Group
	Score 4	Score 5	Chem. 103
Students	171	82	6,951
Chem. 104 GPA	3.44	3.67	2.85
% As	47	68	22
% C or better	99	99	94

*Percentages in bold indicate grades for the AP students that are significantly different from the grades of the comparison group based on a Chi-square test (95% confidence interval).

BIOLOGY

The Advanced Placement Biology course is designed to be taken after completion of both high school biology and high school chemistry courses. It is designed to be equivalent to a typical first-year biology college course taken by intended biology majors. Thirteen percent (13%) of UW-Madison new freshmen take the AP Biology exam.

Our current practice is to award five credits of elective biological science credit for students with a 4 or 5 on the AP Biology exam. We do not currently award credit for Biology 151¹¹ (Introductory Biology), the first of two courses in the Introductory Biology sequence. However, advisors of incoming students sometimes allow students to bypass Biology 151 and enroll directly in Biology 152. Because these exceptions are made, we are able to examine the grades in the subsequent course, Biology 152.

Compared to students who took Biology 151 at UW-Madison, students with scores of 4 or 5 on the AP Biology exam are equally (AP score of 4) or more (AP score of 5) likely to get As in Biology 152, the second course in the Introductory Biology sequence (Table 8). Almost all students get at least a C or better in Biology 152 and the AP students are just as likely to do so as the students who take Biology 151 at UW-Madison.

Since the UW-Madison equivalency for AP Biology was initially established, the landscape of biology education at UW-Madison has changed. Based on this analysis and on recent biology organizational changes, we suggest that the Institute for Cross College Biology Education reexamine the rationale for awarding elective credit, rather than credit for Biology 151, for students with AP Biology scores of 4 or 5. The evidence suggests that AP Biology is adequate preparation for Biology 152 at UW-Madison.

Table 8
Biology 152 Final Course Grades
by Prerequisite Completion Method

	AP Biology Group		Comparison Group
	Score 4	Score 5	Biology 151
Students	278	318	707
Biology 152 GPA	3.06	3.39	3.05
% As	19	39	21
% C or better	97	98	97

*Percentages in bold indicate grades for the AP students that are significantly different from the grades of the comparison group based on a Chi-square test (95% confidence interval).

ECONOMICS

The Advanced Placement Economics courses (Macroeconomics and Microeconomics) are designed to be similar to typical introductory college economics courses. Five percent (5%) of UW-Madison new freshmen take the AP Microeconomics exam and 6% take the AP Macroeconomics exam.

Microeconomics

AP students who receive a 4 or 5 on the AP Microeconomics exam receive four credits for Economics 101 (Principles of Microeconomics). Some of these students subsequently take Economics 301 (Intermediate Microeconomic Theory).

Compared to non-AP credit students who took Economics 101 at UW-Madison, students who receive AP credit for scores of 4 or 5 on the AP Microeconomics exam receive As in equal (score of 4) or greater proportion (score of 5) compared to students who take Economics 101 at UW-Madison (Table 9). The AP Microeconomics students are equally likely to get a C or better in Economics 301.

Table 9
Economics 301 Final Course Grades
by Prerequisite Completion Method

	AP Microeconomics Group		Comparison Group
	Score 4	Score 5	Econ 101
Students	67	42	916
Econ 301 GPA	3.13	3.51	3.01
% As	21	43	19
% C or better	97	100	94

*Percentages in bold indicate grades for the AP students that are significantly different from the grades of the comparison group based on a Chi-square test (95% confidence interval).

Students who receive scores of 4 and 5 on the AP Macroeconomics exam receive four credits for Economics 102 (Principles of Macroeconomics). Some of these students subsequently take Economics 302 (Intermediate Macroeconomic Theory).

Compared to students who took Economics 102 at UW-Madison, students with AP credit based on scores of 4 or 5 on the AP Macroeconomics exam receive As in equal (score of 4) or greater proportion (score of 5) compared to students who take Economics 102 at UW-Madison (Table 10). The AP Macroeconomics students are equally likely to get a C or better in Economics 302.

Table 10
Economics 302 Final Course Grades
by Prerequisite Completion Method

	AP Macroeconomics Group		Comparison Group
	Score 4	Score 5	Econ 102
Students	59	74	890
Econ 302 GPA	3.11	3.43	3.01
% As	19	41	19
% C or better	98	97	94

*Percentages in bold indicate grades for the AP students that are significantly different from the grades of the comparison group based on a Chi-square test (95% confidence interval).

This evidence supports the continued awarding of credit for Economics 101 and 102 for scores of 4 or 5 on the AP Microeconomics and AP Macroeconomics exams.

PSYCHOLOGY

The Advanced Placement Psychology course is designed to be similar to typical introductory college psychology course that broadly covers the discipline of psychology including major theoretical frameworks, ethics, and sub-disciplines of psychology. Seventeen percent (17%) of UW-Madison new freshmen take the AP Psychology exam.

AP students who receive a 4 or 5 on the AP Psychology exam receive three credits for Psychology 202 (Introduction to Psychology). Some of these students subsequently take Psychology 210 (Basic Statistics for Psychology) and Psychology 509 (Abnormal Psychology).

In Psychology 210, students with AP credit based on scores on the AP Psychology exam receive As in equal (score of 4) or greater (score of 5) proportions compared to students who take Psychology 202 at UW-Madison (Table 11). The AP Psychology students receive at least a C or better in equal proportions to the comparison group.

**Table 11
Psychology 210 Final Course Grades
by Prerequisite Completion Method**

	AP Psychology Group		Comparison Group
	Score 4	Score 5	Psych 202
Students	89	115	253
Psych 210 GPA	2.62	3.07	2.68
% As	12	28	18
% C or better	88	97	90

*Percentages in bold indicate grades for the AP students that are significantly different from the grades of the comparison group based on a Chi-square test (95% confidence interval).

In Psychology 509, students with AP credit based on exam scores on the AP Psychology exam receive As in equal (score of 4) or greater (score of 5) proportions compared to students who take Psychology 202 at UW-Madison (Table 12). Students with AP Psychology credit based on exam scores of 5 are also more likely to receive at least a C or better compared to the comparison group who take Psychology 202 at UW-Madison.

**Table 12
Psychology 509 Final Course Grades
by Prerequisite Completion Method**

	AP Psychology Group		Comparison Group
	Score 4	Score 5	Psych 202
Students	262	289	1,030
Psych 509 GPA	2.46	2.98	2.75
% As	17	30	21
% C or better	89	96	91

*Percentages in bold indicate grades for the AP students that are significantly different from the grades of the comparison group based on a Chi-square test (95% confidence interval).

This evidence supports the continued awarding of credit for Psychology 202 for scores of 4 or 5 on the AP Psychology exam.

ENGLISH

There are two Advanced Placement courses in English – Language and Literature. The AP English Language course is designed to help students become skilled readers of prose written in a variety of contexts and to become skilled writers, able to compose for a variety of purposes. The AP English Literature course is designed to engage students in critical reading and analysis of imaginative literature. Both are designed to be similar to courses typically taken by first-year college students. Fifteen percent (15%) of UW-Madison new freshmen take the AP English Language exam. Twenty-four percent (24%) take the AP English Literature exam, making this the most common exam taken by UW-Madison new freshmen.

English Language

AP students who receive a 4 or 5 on the AP English Language exam receive three credits of an English elective and are exempted from the general education Communication A requirement. Because these students are not given course credit for their AP exam scores, there is no subsequent course to analyze. However, Journalism 201 (Introduction to Mass Communication) requires prior completion of the Communication A requirement so, for the AP English Language exam, we examine the equivalency of this general education exemption.

Students who fulfill the Communication A requirement based on scores of 4 or 5 on the AP English Language exams are much more likely to get As in Journalism 201 compared to students who take a Communication A course at UW-Madison (Table 13). The AP English Language credit students are as likely to receive a C or better in the course compared to students in the comparison group of UW-Madison Communication A completers.

**Table 13
Journalism 201 Final Course Grades
by Prerequisite Completion Method**

	AP English Language Group		Comparison Group
	Score 4	Score 5	Com A Req.
Students	233	75	1,417
Journal. 201 GPA	3.58	3.66	3.39
% As	47	55	23
% C or better	98	99	99

*Percentages in bold indicate grades for the AP students that are significantly different from the grades of the comparison group based on a Chi-square test (95% confidence interval).

English Literature

AP students who receive a 4 or 5 on the AP English Literature exam receive three credits of an English elective that meets literature breadth requirements and are exempted from the general education Communication A requirement. As with the AP English Language exam, because these students are not given course credit for their AP exam results, there is no subsequent course to analyze. As with the AP English Language, these students sometime take Journalism 201 (Introduction to Mass Communication) which requires prior completion of the Communication A requirement.

As with AP English Language, students who fulfill the Communication A requirement based on scores of 4 or 5 on the AP English Literature exam are much more likely to get As in Journalism 201 compared to students who fulfill their Communication A requirement with a UW-Madison course (Table 14). The AP English Literature students are equally as likely to receive a C or better in Journalism 201 compared to students in the comparison group who completed the Communication A requirement at UW-Madison.

Table 14
Journalism 201 Final Course Grades
by Prerequisite Completion Method

	AP English Literature Group		Comparison Group
	Score 4	Score 5	Com A Req.
Students	348	98	1,313
Journal. 201 GPA	3.66	3.68	3.39
% As	48	58	23
% C or better	<i>100</i>	<i>99</i>	<i>99</i>

*Percentages in bold indicate grades for the AP students that are significantly different from the grades of the comparison group based on a Chi-square test (95% confidence interval).

This evidence supports the conclusion that scores of 4 or 5 on the AP English exams should continue to exempt students from the general education Communication A requirement.

We are not currently allowing students to fulfill the Communication A requirement with AP English scores of 3. Given that AP English students with scores of 4 and 5 are more than twice as likely to get As in Journalism 201 compared to students who fulfill their Communication A requirement at UW-Madison, we wonder if students with 3s on the AP English exam might also do well in subsequent Communication A-required courses? We recommend that the

Undergraduate General Education Committee and the English department review these findings.

POLITICAL SCIENCE

The Advanced Placement course U.S. Government and Politics (U.S. Government hereafter) is designed to be similar to typical introductory college American politics course. Nine percent (9%) of UW-Madison new freshmen take the AP U.S. Government exam.

AP students who receive a 4 or 5 on the AP U.S. Government exam receive four credits for Political Science 104 (Introduction to American Politics and Government). Political Science 104 is not a prerequisite for any courses that these students subsequently take in great number. Therefore, for this AP exam, there is not really a similar way to test the appropriateness of the current AP exam equivalencies. Some of these students subsequently take Political Science 106 (Introduction to Comparative Politics). Even though Political Science 104 is not a prerequisite for this course, we expect that AP credit students, because they have already had a college-level political science class, should do at least as well as other students who have also had an introductory political science course at UW-Madison.

Students with AP credit based on scores of 4 and 5 on the AP U.S. Government exam are more likely to get As in Political Science 106 compared to students who take Political Science 104 at UW-Madison before taking Political Science 106 (Table 15). All students in this analytic group received at least a C in this course.

Table 15
Political Science 106 Final Course Grades
by Prerequisite Completion Method

	AP U.S. Government Group		Comparison Group
	Score 4	Score 5	Poli Sci 106
Students	177	67	940
Poli Sci 106 GPA	3.41	3.51	3.17
% As	32	37	19
% C or better	<i>100</i>	<i>100</i>	<i>100</i>

*Percentages in bold indicate grades for the AP students that are significantly different from the grades of the comparison group based on a Chi-square test (95% confidence interval).

Even though this AP test was evaluated in a slightly different manner, this evidence supports the continued awarding of credit for Political Science 104 for scores of 4 or 5 on the AP U.S. Government exam.

HISTORY

There are two AP History exams that are taken by at least 5% of UW-Madison new freshmen – U.S. History and European History. Both courses are designed to prepare students for intermediate and advanced history courses by making demands that are equivalent to those in a full-year introductory college history course. Twenty-three percent (23%) of UW-Madison new freshmen take the AP U.S. History exam, second in popularity after the AP English Literature exam. Eight percent (8%) of UW-Madison new freshmen take the AP European History exam.

U.S. History

AP students who receive a 4 or 5 on the AP U.S. History exam receive six credits for both History 101 and 102 (American History – pre Civil War and American History – Civil War and after). History 101 and 102 are not prerequisites for any courses that these students subsequently take in great number. Therefore, for this AP exam, there is not really a similar way to test the appropriateness of the current AP exam equivalencies. Some of these students subsequently take History 434 (American Foreign Relations, 1901 to the Present). Even though History 101 and 102 are not prerequisites for this course, we expect that AP students, because they have already had a college-level American History class, should do at least as well as other students who have also had an introductory American History course at UW-Madison.

Students with AP credit based on scores of 4 and 5 on the AP U.S. History exam are more likely to get As in History 434 compared to students who take History 101 and 102 at UW-Madison (Table 16). The AP U.S. History students are as likely to receive a C or better in the course compared to students who took History 101-2 at UW-Madison.

Table 16
History 434 Final Course Grades
by Prerequisite Completion Method

	AP U.S. History Group		Comparison Group
	Score 4	Score 5	History 101-2
Students	136	55	147
History 434 GPA	2.86	3.23	2.53
% As	22	38	11
% C or better	96	98	91

*Percentages in bold indicate grades for the AP students that are significantly different from the grades of the comparison group based on a Chi-square test (95% confidence interval).

European History

AP students who receive a 4 or 5 on the AP European History exam receive six credits for both History 119 and 120 (The Making of Modern Europe: 1500-1815 and Europe and the Modern World: 1815 to the Present). History 119 and 120 are not prerequisites for any courses that these students subsequently take. Therefore, as with the U.S. History exam, there is not really a similar way to test the appropriateness of the current AP exam equivalencies. Some students who take the AP European History exam subsequently take ILS 205 (Western Culture: Political, Economic, and Social Thought I) and Art History 202 (Renaissance to Modern Art). Both of these courses cover topics in more depth that were introduced in the AP European History course. Even though History 119 and 120 are not prerequisites for these courses, we expect that AP students, because they have already studied college-level European History, should do at least as well as other students who have also had introductory European History courses at UW-Madison.

Students with AP credit based on exam scores of 4 and 5 on the AP European History exam receive the same (score of 4) or greater (score of 5) proportion of As as the comparison group of students who take History 119 and 120 at UW-Madison (Table 17). All students received a C or better in ILS 205.

Table 17
ILS 205 Final Course Grades
by Prerequisite Completion Method

	AP European History Group		Comparison Group
	Score 4	Score 5	Hist. 119-120
Students	35	27	93
ILS 205 GPA	3.46	3.54	3.27
% As	34	37	17
% C or better	100	100	100

*Percentages in bold indicate grades for the AP students that are significantly different from the grades of the comparison group based on a Chi-square test (95% confidence interval).

Students with AP credit based on score of 4 and 5 on the AP European History exam get a similar proportion of As in Art History 202 compared to non-AP credit students who take History 119 and 120 at UW-Madison (Table 18). All students in this group got at least a C in Art History 202.

Table 18
Art History 202 Final Course Grades
by Prerequisite Completion Method

	AP European History Group		Comparison Group
	Score 4	Score 5	Hist. 119-120
Students	45	19	88
Art Hist. 202 GPA	3.80	3.76	3.59
% As	64	74	53
% C or better	100	100	100

*Percentages in bold indicate grades for the AP students that are significantly different from the grades of the comparison group based on a Chi-square test (95% confidence interval).

Even though this AP test was evaluated in a slightly different manner, this evidence supports the continued awarding of credit for History 119 and 120 for scores of 4 or 5 on the AP European History exam.

SUMMARY

There are fourteen Advanced Placement exams that at least five percent of UW-Madison new freshmen take. Students enrolling at UW-Madison are given either course or elective credit based on their AP exam scores. In this analysis, we examine the appropriateness of the current credit awarded for AP exams by comparing the subsequent final course grades for students with AP exam credit and students who take the prerequisite course at UW-Madison. We are able to identify a subsequent course for twelve of the fourteen commonly-taken AP exams.

In all cases analyzed, the proportion of AP students who get at least a C in the subsequent course is the same or greater compared to students who take the prerequisite course at UW-Madison. In many cases, the proportion of AP students who get As in the subsequent course is also the same as or higher compared to the students who take the course at UW-Madison. Based on these results, we find ample evidence to support the appropriateness of our current AP equivalencies.

We recommend two specific areas for follow up. One, because the organizational structure of biology education at UW-Madison has changed since the AP Biology course equivalencies were initially established, we recommend that the Institute for Cross College Biology Education consider awarding credit for Biology 151 for scores of 4 or 5 on the AP Biology exam. We currently award biology elective credit for the AP Biology exam except when advisors approve direct enrollment into Biology 152. Our analysis shows that

AP students who enroll directly in Biology 152 do as well as students who take Biology 151 at UW-Madison. If this suggested change is ultimately adopted, enrollment pressures in this high-demand course may be eased.

Two, we suggest that the Undergraduate Committee on General Education and the English department review the general education equivalencies for AP English exams. Specifically, we wonder if students with 3s on the AP English exams also demonstrate the competencies required to fulfill the Communication A requirement.

In addition to providing evidence of the appropriateness of our current AP course equivalencies, this analysis illustrates that the AP program plays a key role in helping UW-Madison students fulfill general education and course requirements for graduation. In addition to the benefits for the students with AP credit, fully leveraging the AP curriculum can ease demand for all students in high-demand undergraduate courses.

Appendix A
College Board Advance Placement® Credits
For UW-Madison New Freshmen
2004-2008

AP Exam	AP Score			
	3	4	5	Total
Art History	80	93	32	205
Biology	1,272	1,363	1,100	3,735
Calculus AB	1,703	2,145	2,235	6,083
Calculus BC	696	706	1,235	2,838
Chemistry	991	836	587	2,414
Comp. Govern. & Politics	179	115	92	386
Computer Science A	46	111	94	251
Computer Science AB	39	34	57	130
English Language	2,124	1,634	650	4,408
English Literature	3,654	2,659	809	7,122
Environmental Science	206	291	156	653
European History	1,130	833	426	2,389
French Literature	9	6	6	21
French Language	175	87	52	314
German Language	61	57	33	151
Human Geography	60	88	88	236
Italian Lang. & Culture	3	3	2	8
Japanese Lang. & Cul.	0	1	0	1
Latin Literature	11	10	3	24
Latin: Vergil	16	3	5	24
Macroeconomics	360	756	508	1,624
Microeconomics	409	653	362	1,424
Music Theory	49	44	34	127
Physics B	586	432	321	1,339
Physics C: Electronics	60	120	89	269
Physics C: Mechanics	225	226	198	649
Psychology	828	2,014	2,066	4,908
Spanish Language	516	416	205	1,137
Spanish Literature	14	31	5	50
Statistics	844	1,015	548	2,407
Studio Art	71	40	17	128
U.S. Govern. & Politics	1,203	980	406	2,589
U.S. History	2,303	2,591	1,174	6,608
World History	312	304	209	825

¹<http://madisoninitiative.wisc.edu/>

² For one example, see Ewing, M., (2006). *The AP Program and Student Outcomes: A Summary of Research*. New York: The College Board.

³http://apcentral.collegeboard.com/apc/public/repository/ap01.pdf.va_7967.pdf

⁴AP exams test mastery of content taught in AP classes. However, there are other advanced high school courses that also prepare students for AP exams. Students can take AP exams even if they have not taken an AP class.

⁵http://professionals.collegeboard.com/profdownload/AP_Program_Guide_08_FINAL.pdf

⁶http://www.acenet.edu/AM/Template.cfm?Section=Search§ion=Guide_PDFs&template=/CM/ContentDisplay.cfm&ContentFileID=4874

⁷<http://www.admissions.wisc.edu/APIB.php>

⁸http://apa.wisc.edu/admissions/Math_Transition_FYR_Dec2008.pdf

⁹For this analysis, we made the comparison group as comparable as possible to the AP group. For example, we excluded students who could have received AP credit but “chose” to take the equivalent UW-Madison course anyhow. We limited the analysis to students who started as freshmen and (whenever possible) limited the courses to those taken by first-year students. This minimizes the chance that their course grades were influenced by other courses they took at UW-Madison. Nonetheless, these groups of students have other differences that should be noted. First, the AP students in this analysis were in their first-year at UW-Madison and, in most cases, were in their first semester. The comparison group was at least in their second semester by definition because they had to have taken the AP-equivalent course at UW-Madison. Some differences between these groups may be influenced by adjustment issues experienced by first-year students, including the fact that the UW-Madison course is double the pace of their high school course.

¹⁰In many cases, we show that the AP-credit students get higher grades in the subsequent course compared to students who took the corresponding UW-Madison course. This analysis should not be used to suggest that the AP course is better than the corresponding UW-Madison course. The AP students are not necessarily typical high school students. For one, they attend a high school that offers advanced coursework. These high schools tend to be well-resourced with highly qualified teachers. Two, even at high schools that offer advanced courses, the students who take advantage of them are motivated enough to do the extra work and, in some cases, have qualified for limited seats in these courses on the basis of past academic performance, grade-point or previous achievement test results. We would not expect students who don't have these resources or record of past achievement to perform the same.

¹¹ The Biology 151/152 sequence is cross-listed with Botany and Zoology. All students in this course, regardless of the department through which they registered for the course, are included in this analysis.