

*Background on the Increase
in the UNC Board of Governors'
Minimum Course Requirements
for Undergraduate Admission*

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**The University of North Carolina
Office of the President**

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Proposed Increase in the UNC Board of Governors' Minimum Course Requirements for Undergraduate Admission

The Proposal

It is proposed that the UNC Board of Governors raise its minimum course requirements for undergraduate admission gradually over the next six years.

- Currently, there is no foreign language requirement, only a recommendation that students take two units in the same language—one to be taken in the senior year. *It is proposed that two units of the same foreign language be required for admission, effective in the fall semester of 2004.*
- Currently, the requirement in mathematics is three units of high school coursework including algebra I, geometry, and algebra II, or an integrated mathematics sequence of three courses that cover the same topics. Students who wish to skip geometry and take instead a math course for which algebra II is a prerequisite are permitted to do so. *It is proposed that one more unit of mathematics beyond algebra II be added to the present requirement, bringing the total number of units in mathematics to four. This change would be effective in the fall semester of 2006 and would affect all institutions except the NC School of the Arts.*

Background

In February 1984—following action by the N.C. Board of Education to raise high school graduation requirements in 1982-83 from 16 to 18 units, and in 1986-87 from 18 to 20 units—the UNC Board of Governors established minimum course requirements (MCR) for undergraduate applicants. These requirements were phased in over a six-year period: *interim requirements* for those entering in the fall of 1988, and *full requirements* for those entering in the fall of 1990. Courses required by MCR (at all 16 institutions of the University of North Carolina) have not changed since 1990.

For the class of 1990 and beyond, the following courses are required for admission, in addition to an institution's own specific requirements:

- In **English**, four course units¹ emphasizing grammar, composition, and literature;
- In mathematics, three course units including algebra I, algebra II, and geometry, or a higher level mathematics course for which algebra II is a prerequisite;
- In **science**, three course units including
 - at least one unit in a life or **biological science** (for example, biology),
 - at least one unit in **physical science** (for example, physical science, chemistry, physics), and

¹ “Course units” as defined in these requirements may include those high school-level courses taken and passed by an applicant after graduating from high school, as well as those taken while enrolled as a high school student. For some transfer students and students who graduated from high school prior to 1990, special considerations have been made.

- at least one **laboratory course**; and
- In **social studies**, two course units including one unit in **U.S. history**, but an applicant who does not have the unit in U.S. history may be admitted on the condition that at least three semester hours in that subject will be passed by the end of the sophomore year.
- In addition, it is recommended that prospective students complete at least two course units in one foreign language, and take one foreign language course unit and one mathematics course unit in the twelfth grade.

Individual constituent institutions may require other courses in addition to the minimum requirements.

Minimum Requirements in Other States and Systems

The University of North Carolina was not alone in raising its minimum course requirements in the mid- to late-80's. Following publication of *The Nation at Risk* in 1983, school districts and states across the country raised high school graduation requirements, while colleges and universities followed suit by setting or raising minimum high school coursework requirements for undergraduate admission. The most recent analysis of this trend is summarized in Table 1, which is reproduced from the report *Statewide College Admissions, Student Preparation, and Remediation Policies and Programs* by SHEEO (State Higher Education Executive Officers), completed in January 1998. It shows that 32 states or university systems have set minimum requirements and that the UNC requirements are generally in line with those of other states. However, several noteworthy differences are discussed in the report.

First, the UNC requirement in mathematics is more prescriptive than in some states or systems in that it specifies algebra I and II and geometry (or, if not geometry, then a course for which algebra II is a prerequisite) or integrated mathematics I, II, and III. Thus, it prevents students from fulfilling the requirement in mathematics by taking non-college preparatory mathematics courses such as general math or vocational math. Because remedial college courses in mathematics typically cover the content of high school algebra II, the UNC requirement ensures that no student who takes remedial mathematics in college does so for lack of exposure to the content of algebra II. Table 1 shows that the number of course units required in mathematics is three in all states except Arizona, where a fourth unit of mathematics beyond algebra II is required, and in West Virginia, where only two units are required.

Second, Table 1 also shows that 20 of the 32 states or systems that set minimum coursework requirements specify that at least two course units in one foreign language be completed in high school. The UNC requirements only *recommend* that two or more units of a foreign language be completed, as is done in Missouri and North Dakota. Similarly, Table 1 shows that 23 of the 32 states or systems require more than the two units of social science required by UNC, but 12 of the 32 states or systems require fewer than the three units of science required by UNC's MCR.

Table 1. Summary of Coursework Required for Admission (Expressed as One-year Carnegie Units)²

	English	Math	Science	Social Science	Foreign Language	Other/Electives	Total Units
Arizona ³	4	4	3	2	2	1 fine arts	16
Univ of California	4	3	2	2	2	2 electives	15
California State University	4	3	1	1	2	1 visual/performing arts; 3 electives	15
Florida	4	3	3	3	2	4 electives	19
Georgia	4	3	3	3	2		15
Idaho	4	3	3	2-1/2	1	1-1/2 electives	15
Illinois	4	3	3	3		2 electives	15
Iowa	4	3	3	2-3	0-2		12-15
Kansas	4	3	3	3		1 computer science	14
Kentucky	4	3	2	2		1 health/PE; 8 electives	20
Maryland	4	3	3	3		2 foreign language or advanced technology; 6 electives	21
Massachusetts	4	3	3	2	2	2 electives	16
Minn. State Colleges and Universities	4	3	3	3	2		15
Mississippi	4	3	3	3		1/2 computer applications; 1 foreign language or world geography; 1 other elective	15-1/2
Missouri	4	3	2	3	[2] ⁴	1 visual /performing arts; 3 electives	16
Univ of Nebraska	4	3	3	3	2	1 elective	16
Nevada	4	3	3	3		1/2 computer science	13-1/2
City Univ of NY	4	3	2	4	2	1 fine/visual/perf arts	16 ⁵
North Carolina	4	3	3	2			12
North Dakota	4	3	3	3	[2] ⁴		13
Ohio ⁶	4	3	3	3	3		16
Oklahoma	4	3	2	3	3		15
Oregon	4	3	2	3	2		14
Rhode Island	4	3	2	2	2	1/2 computer science	13-1/2
South Carolina	4	3	2	3	2	1 PE or ROTC; 1 elective	16

² Source: Pages 10-11 of *Statewide College Admissions, Student Preparation, and Remediation Policies and Programs: Summary of a 1997 SHEEO Survey*, Alene Bycer Russell, January 1998.

³ Alternatives to high school coursework have been developed for each subject area, based on minimum scores on specific ACT or SAT tests or on specific courses taken at accredited institutions of higher education.

⁴ Strongly recommended, but not required.

⁵ Currently only 10 units are *required* for admission to senior colleges in CUNY, and the 16 units described here are *recommended*. By 2000, all 16 units will be required.

⁶ The course units listed here describe the college preparatory curriculum developed by the Ohio Board of Regents in 1981; the Board *recommended* that all institutions adopt these as requirements for unconditional college admission, and institutions have done so voluntarily. Institutions remain autonomous, however, and strictly speaking, there are no statewide course *requirements*.

South Dakota ⁷	4	3	3	3		1/2 fine arts	13-1/2
Tennessee	4	3	2	2	2	1 visual/performing arts	14
Utah	4	3	3	1	2	4 electives	17
Virginia ⁸	4	3	3	3	3	1 fine/practical arts; 2 health/PE; 4 electives	23
Washington	4	3	2	3	2	1 elective	15
West Virginia	4	2	2	3			11
Wisconsin	4	3	3	3		4 electives	17

Third, with the exception of West Virginia, the total number of units required by UNC (12) is the least number required by any state or system that has set minimum course requirements. Most states or systems require between 14 and 17 units, with Kentucky and Maryland requiring 20 and 21, respectively. In one sense, therefore, the UNC requirements provide less direction to college-bound students than do those of all other states and systems other than West Virginia and those states that have not established any minimum requirements other than those set by individual institutions in their states.

The data in Table 1 suggest that the UNC requirements are relatively weak in the areas of foreign language, social science, and in the overall number of courses required, and relatively average in the areas of mathematics and science courses required.

The Impact of High School Curriculum on College Success

At the time that most states and systems were setting minimum coursework requirements for undergraduate admission, little research had been done to evaluate the contribution of high school curriculum to students' success in college. The primary reason for this was the lack of available data and the insufficiency in computing power needed to summarize and analyze high school transcript data at the individual student level. As both of these constraints have been removed, research has revealed the strong contribution that high school curriculum—separate and apart from grade point average and class rank—makes to students' academic success in college.

One such study by the U.S. Department of Education, entitled *Answers in the Tool Box, Academic Intensity, Attendance Patterns, and Bachelor's Degree Attainment*, by Clifford Adelman, was completed in June 1999. The study sought to identify the relative contribution—through correlation analysis—that test scores, high school grades, class rank, and curriculum taken in high school (labeled “academic intensity” in the study) make to completion of the baccalaureate degree. His findings:

- No matter how one divides the universe of students, the curriculum measure produces a higher percent earning bachelor's degrees than either of the other measures. . . The correlation of curriculum with bachelor's degree attainment is also higher (.54) than test scores (.48) or class rank/GPA (.44).

⁷ Alternatives to high school coursework have been developed for each subject area, based on minimum scores on specific ACT or Advanced Placement tests.

⁸ In 1983 the State Council of Higher Education developed a 23-unit Advanced Studies High School Diploma, which it recommended for college-bound students. There are no statewide requirements.

- The impact of a high school curriculum of high academic intensity and quality on degree completion is far more pronounced—and positively—for African-American and Latino students than any other pre-college indicator of academic resources. The impact for African-American and Latino students is also much greater than it is for White students.
- Of all pre-college curricula, the highest level of mathematics one studies in secondary school has the strongest continuing influence on bachelor's degree completion. Finishing a course beyond the level of algebra II (for example trigonometry or pre-calculus) more than doubles the odds that a student who enters postsecondary education will complete a bachelor's degree.

The Adelman study drew data from the high school and college transcripts of a national sample of 14,825 students who were high school sophomores in 1980. They were followed until they were roughly 30 years old in 1993.

A second study by Andrew C. Porter was reported in the *Brooking Papers on Education Policy* in 1998. Although its purpose was somewhat different from that of the Adelman study, its conclusion about the importance of curriculum was similar. The Porter study is particularly germane to the issue of setting minimum course requirements, because it sought to determine whether the strategy of simply raising the curriculum bar had been successful in increasing student learning. In other words, it addressed the question of whether minimum curriculum standards set by school districts and states had been successful in raising achievement in mathematics and science, the two subjects in which standards had been raised the most. His study addressed the question of whether the standards had led to students taking more math and science courses, whether they had led to a decrease in high school graduation rates, and whether course content in the higher-level math and science courses had been watered down. A summary of his conclusions:

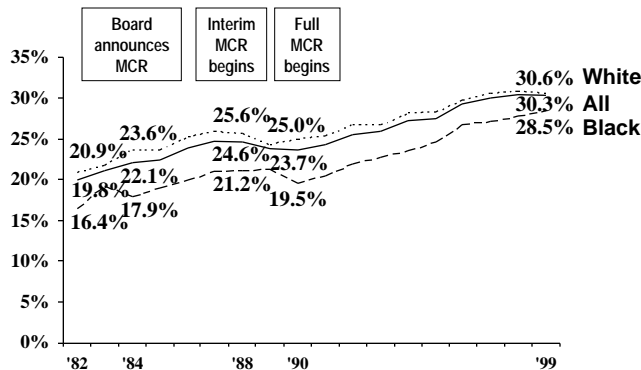
The findings of these analyses are largely positive on the effects of increased standards for high school course taking in mathematics and science. As states raised their graduation requirements in mathematics and science, students responded by taking more mathematics and science courses, including more college preparatory mathematics and science courses. At the same time, the probabilities of high school graduation remained unchanged, with students just as likely to graduate from high school after the implementation of the new standards as before that time. Furthermore, essentially no evidence exists that the influx of increased numbers of students into mathematics and science courses resulted in a watering down of those courses.

Impact of the Board's Action in 1984

Based on the findings of Adelman and Porter, the Board's 1984 increase in minimum undergraduate course requirements would be expected to have had: 1) no negative impact on student access to UNC institutions; 2) a positive impact on baccalaureate degree attainment; and 3) a stronger positive impact on minority students. The evidence supports all three hypotheses. Figure 1 presents data on the UNC attendance rates of North Carolina high school graduates for the years 1982 to 1999. It shows that attendance rates increased with the announcement of increased requirements and with the implementation of interim requirements, but dropped temporarily with the imposition of the full requirements in 1990. Since 1991, however, UNC

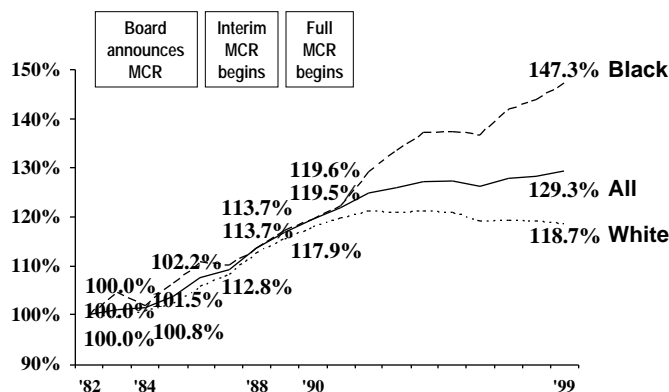
attendance rates have increased steadily, and the increase has been faster for Black students than for White students. By 1999, the gap in the UNC attendance rates of Black and White high school graduates was only 2.1 percentage points, the smallest it had been in this 18-year period. Moreover, the UNC attendance rate of all North Carolina high school students had increased to a near record level of 30.3 percent.

Figure 1. UNC Attendance Rates of Previous Year's High School Graduates



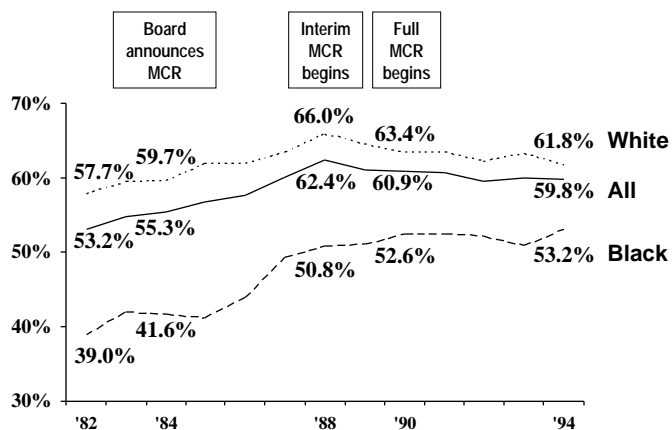
Overall enrollment trends show much the same picture and reflect the combined impact of the minimum course requirements on both attendance and retention (the two determinants of enrollment). Figure 2 shows these trends in headcount enrollment by expressing all data as a percent of the 1982 headcount. This method of displaying the three enrollment series facilitates comparison by choosing a common scale. Again, the data show positive trends overall. Black enrollment in 1999 had increased by 47 percent since 1982 compared to White enrollment, which had increased by only 19 percent. The increase in Black enrollment was greatest from 1991 to 1999.

Figure 2. Changes in UNC Enrollment since 1982



Perhaps the greatest impact was on retention and graduation rates. Data in Figure 3 show the persistence rates (retention rates plus graduation rates) five years after entry for cohorts of first-time full-time UNC freshmen who matriculated in the years between 1982 and 1994. The data show that five-year persistence rates increased steadily for Black students during these years, closing by 10.1 percentage points the 18.7 percentage-point gap with White students that existed in 1982.

Figure 3. Five-Year Persistence Rates of UNC First-Time, Full-Time Freshmen by Year of Entry



Taken together, the data in Figures 1, 2, and 3 suggest that the Adelman and Porter findings apply quite well to the minimum undergraduate course requirements imposed by the Board in 1988 and 1990.

Raising the UNC Minimum Course Requirements for Undergraduates

The comparison of the UNC minimum course requirements to those of other states and systems, in combination with the results of the Adelman and Porter studies and the findings with respect to the Board actions in 1988 and 1990, suggests that the UNC Board of Governors should consider increasing its minimum course requirements again. The most promising subjects to be increased are foreign languages, where the UNC requirements compare weakly to other states and systems, and mathematics, where they compare adequately to other states and systems, but where the literature suggests increased standards could have a particularly positive effect on college success.

To examine empirically the likely impact of either or both of these changes, the General Administration has obtained a senior-year transcript database from the public schools of North Carolina and matched it with data on freshman applicants and enrollees at the 16 UNC institutions one year later. The data are taken from a specially prepared file of 1997-98 high school seniors and from the fall 1998 UNC Student Data and course grade files. For the analysis, seniors were sorted into 12 curriculum subgroups—each consisting of students who had met the 1990 MCR but varied according to the number of foreign language and mathematics units they had completed in high school. With respect to foreign language courses, students with one or no units of foreign language, two units, three units, and four or more units were grouped separately. With respect to mathematics courses, students with only the three units of mathematics required by MCR were grouped separately from those with exactly four units, or those with five or more units. Thus, the combination of four foreign language subgroups and three mathematics subgroups resulted in 12 curriculum subgroups used in our analysis.

The analysis looked at average measures of academic performance associated with each curriculum subgroup. The measures examined were:

- Average applicant SAT scores
- Percent of applicants to UNC institutions who were accepted by at least one UNC institution
- Percent placed in regular or advanced English
- Percent placed in regular or advanced mathematics
- Percent placed in regular or advanced English or mathematics
- First-semester retention rate
- Freshman- to sophomore-year retention rate
- First-semester GPA
- First-year GPA
- Percent with a first-semester GPA of “C” or better
- Percent with a first-year GPA of “C” or better

The values of these measures for each of the 12 curriculum subgroups are displayed in Figures 4 through 14. Figures 4 and 5 relate to seniors in each subgroup who submitted at least one application to a UNC institution. Figures 6 through 14 relate to seniors in each subgroup who enrolled at a UNC institution in the fall 1998 semester following their graduation in the 1997-98 academic year. The data in these figures relate to the academic performance of students who enrolled at any of the 16 constituent institutions of the University. Arrows in each figure point to three bars:

- The first (labeled “**MCR until 2004**”) indicates the performance of students who met only the current MCR with respect to foreign languages and mathematics;
- The second (labeled “**MCR in 2004**”) indicates the performances of students who met the current MCR and the minimal additional units of foreign language proposed to be required in 2004;
- The third (labeled “**MCR in 2006**”) indicates the performance of students who met the current MCR, the minimal additional units of foreign languages proposed to be required in 2004, and the additional unit of mathematics proposed to be required in 2006.

The figures show a consistency of improved academic performance associated with the depth of the curriculum in both foreign language and mathematics. The current MCR are shown to be minimal in that students who met only the MCR achieved SAT scores of only 844 (142 points lower than the State’s 1999 average of 986) and were accepted at a rate of only two-thirds. Their rate of placement in remedial English or mathematics was 43 percent, and only 88 percent finished the first semester, while only 67 percent finished the first year. They averaged grades below 2.0 as of the end of the first semester and the first year. By the end of the first year, only 35 percent had earned a GPA of “C” or better. The gains associated with the MCR levels proposed for 2004 and 2006 are shown in all of Figures 4-14, and provide the empirical basis for suggesting that the increases be adopted.

Figure 4. Average SAT of Applicants

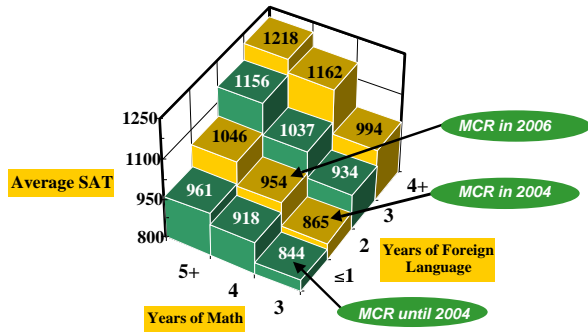


Figure 5. Percent Accepted by a UNC Institution

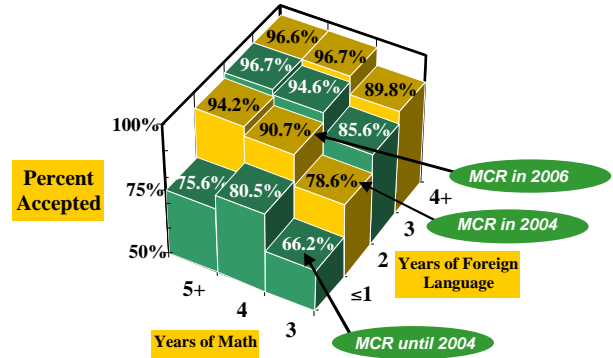


Figure 6. Percent Placed in Regular or Advanced English

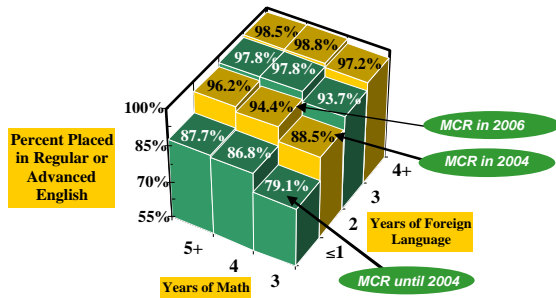


Figure 7. Percent Placed in Regular or Advanced Math

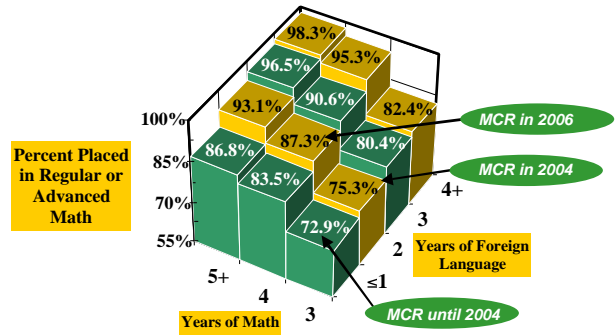


Figure 8. Percent Placed in Regular or Advanced English and Math

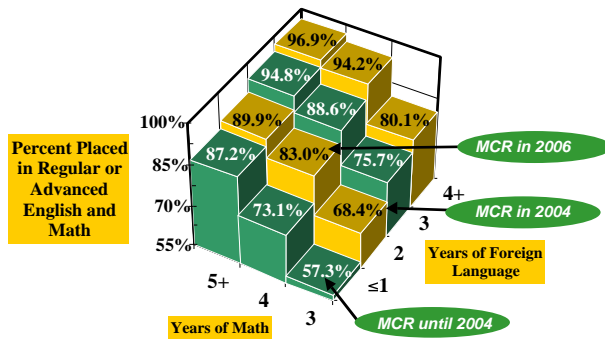


Figure 9. First-Semester Retention

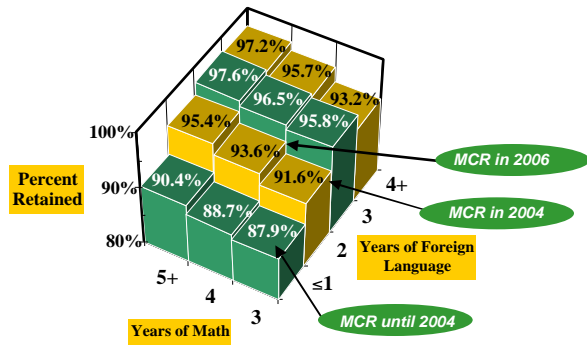


Figure 10. Freshman- to Sophomore-Year Retention

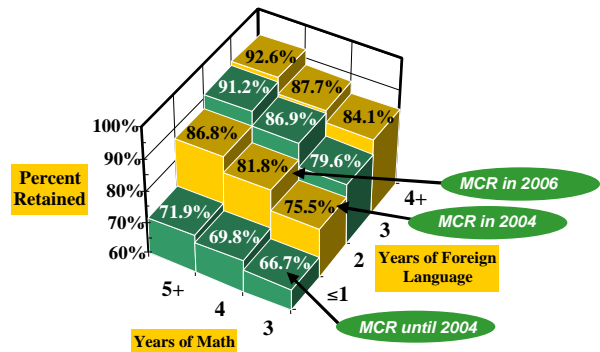


Figure 11. First-Semester GPA

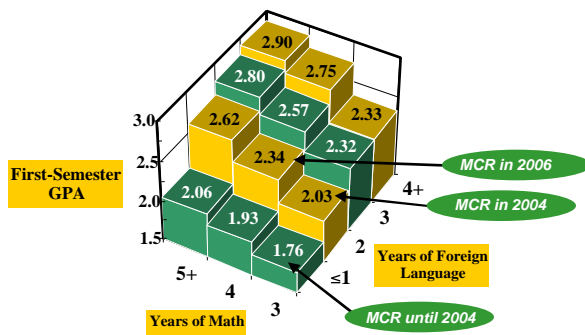


Figure 12. First-Year GPA

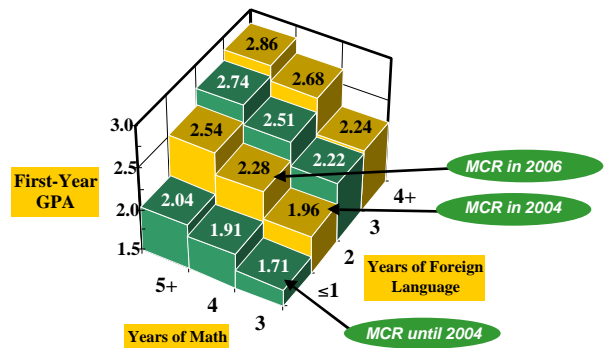


Figure 13. Percent with First-Semester GPA of "C" or Better

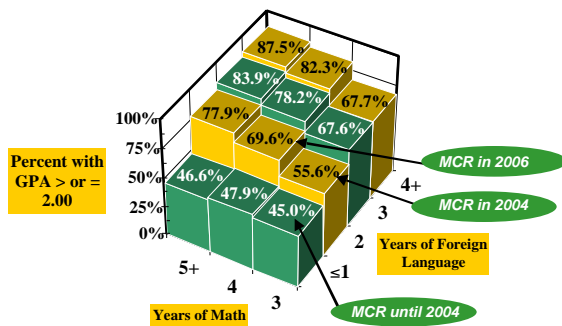
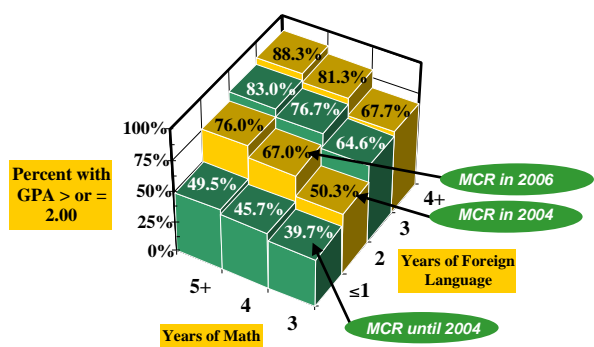


Figure 14. Percent with First-Year GPA of "C" or Better



Impact on Institutions and Students by Race

Just as the 16 campuses have different freshman class profiles with respect to class rank and SAT scores, they also have different high school curriculum profiles for their enrolled freshmen. Institutions having many students that have met only the current MCR will face greater challenges in recruiting freshmen who meet the requirements proposed for 2004 and 2006. Similarly, minority students, who are more likely to have met only the current MCR, will be affected more extensively by the increased MCR than will White students. Tables 2 and 3 show the institutional and racial impact of the proposed changes if course-taking patterns of public high school students do not change to meet the new requirements.

The data in Table 2 show that fewer than five percent of enrolled freshmen system-wide lacked the two units of foreign language that would be required of all freshmen in 2004, but that percentage ranged from a low of one percent at UNC-CH and UNCC to a high of 15 percent at ECSU. Similarly, the data show that almost 17 percent of freshmen currently lack the foreign language and mathematics requirements that would be required in 2006, but the percentage ranged from a low of three percent at UNC-CH to a high of 61 percent at FSU. Similar data shown in Table 3 reveal significant differences by race. The gaps between the percent of Black and White students who meet the current foreign language requirement and the 2006 requirement are 7 percentage points and 20 percentage points, respectively.

Table 2. Percent of Fall 1998 Freshmen from Selected NC Public High Schools with (1) Two or More Units of the Same Foreign Language, (2) Four or More Units of Math, and (3) Four or More Units of Math and Two or More Units of the Same Foreign Language, by Institution

<u>Institution</u>	<u>Foreign Language</u>	<u>Math</u>	<u>Math and Foreign Language</u>
ASU	96.6%	84.6%	82.3%
ECU	95.4	80.6	77.9
ECSU	84.8	44.3	41.3
FSU	85.6	43.1	38.8
NCA&TSU	85.5	63.6	57.0
NCCU	87.0	65.0	58.9
NCSU	98.1	94.5	93.5
UNCA	96.6	85.1	83.3
UNC-CH	99.4	97.1	96.5
UNCC	98.9	81.2	80.4
UNCG	98.0	82.1	80.9
UNCP	90.4	63.7	60.5
UNCW	97.4	85.8	83.4
WCU	87.9	63.4	57.9
WSSU	90.1	57.0	52.3
UNC ALL	95.3%	81.1%	78.7%
Historically Black	86.5	57.5	52.1
Historically White/Am. Ind.	96.9	85.3	83.5

Table 3. Percent of Fall 1998 Freshmen from Selected NC Public High Schools with (1) Two or More Units of the Same Foreign Language, (2) Four or More Units of Math, and (3) Four or More Units of Math and Two or More Units of the Same Foreign Language, by Race

<u>Race</u>	<u>Foreign Language</u>	<u>Math</u>	<u>Math and Foreign Language</u>
White	96.9%	85.8%	84.0%
Black	90.7	67.4	63.5
American Indian	95.9	76.5	74.5
Asian	94.0	90.2	85.7
Hispanic	95.6	78.0	75.4
UNC ALL	95.3%	81.1%	78.7%

Can the University Raise MCR and Expand Access?

Tables 2 and 3 may raise doubts about whether the University can increase its undergraduate requirements and maintain its commitment to expanding access. However, the evidence related to the setting of MCR in the 1980's and the study by Porter, which suggest that students and high schools rise to the challenges of raised course requirements, go far to allay doubts. It is clear, too, that improvements in academic success in college that are associated with the proposed increases in MCR suggest that adopting the increases will lead to improved efficiency and equity. Efficiency is improved because scarce University resources are concentrated on students most likely to succeed. Equity is improved because low-income students and underrepresented minorities, who are least likely to have the guidance needed to pursue a strong college preparatory curriculum in high school, are most likely to be prompted to do so by the new requirements. Finally, proponents of the increases in MCR would note that the State's commitment to be "First in America" by 2010 requires that its University be the national leader in promoting excellence in undergraduate education.

To reach the twin goals of excellence and access will require unprecedented levels of collaboration among the public schools, the constituent institutions of the University, and the community colleges to align their curricula, to train additional teachers in foreign language and mathematics, to provide professional development for currently employed teachers and those seeking alternative routes to teacher licensure, and to promulgate widely the new requirements through tools such as *PATHWAYS*. The Education Cabinet, the Liaison Committee, and new collaborative arrangements will support this effort. The lead time of four and six years between the time of announcement and dates of implementation will afford time for these collaborative activities to develop and flourish. Monitoring of student preparation in the intervening years will assure that students are moving successfully to meet the increased MCR proposed in this report.