

# **MID-TERM AND FINAL GRADE REPORT**

## **SPRING 2006**

**Prepared for  
The Office of the Executive Vice President and Provost**

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**6-27-2006  
For Distribution**

## Purpose

The purposes of this report are twofold. First, we examine the relationship between mid-term grades and final grades and evaluate whether mid-term grades are predictive of student success in undergraduate level courses (as measured by final course grades). Secondly, data in this report are examined with intent to improve student performance, the effectiveness of curriculum delivery, specifically in the core courses, and student-learning outcomes.

A database was created using mid-term and final grades from SIS+ system. All graduate level courses (5- and above) as well as independent studies, internships, teaching assignments, practica, physical education classes, senior honors thesis and other one-to-one classes were removed from the database. In extremely rare cases, a post-baccalaureate or master's level student would be enrolled in an undergraduate-level course and receive a mid-term grade. These grades were included in the report. However, post-baccalaureate and master's level students enrolled in undergraduate courses typically did not receive a mid-term grade and would show up in the analysis with a null record. For purposes of this analysis, all + and – were collapsed into their respective letter grades (e.g., an A+, for example, was treated like an A). As the data in the Table 1 below indicates, approximately two-thirds of all grades are simple letter grades. In a future analysis, we will investigate the impact, if any, of +/- on student performance.

**Table 1**

F05	+	null	-	S06	+	null	-
A	16%	65%	19%	A	12%	68%	19%
B	23%	58%	20%	B	22%	60%	17%
C	22%	62%	16%	C	21%	62%	17%
D	20%	63%	17%	D	19%	66%	15%
F	0%	100%	0%	F	0%	100%	0%
All	18%	65%	17%	All	16%	67%	16%
N= 38,134				N= 32,066			

All mid-term grades recorded for regular undergraduate courses, including labs, were counted. A sample output from spring 2006 is represented by Table 2 below:

**Table 2: Mid-Terms Grades for Selected Courses**

CRSSEC	A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F	Blank	X	NR	NC	CR	W	Total
AHST1304001		26	3	1	5	7	5	5	3	2	6	8	9							80
BA 2301502	1	3	8	4	11	12	11	14	3	4	5	1	1						2	80
BIOL2111001														27						27
CHEM2123101		18						1											1	20
GOVT2301002		9	7	4	30	2	2	7	5		6	3	8						1	84
MATH1325002	6	6	2	7	4	3	3	4	1	3	3	3	21						6	72
PSY 2301001		26			27			31			6		17						2	109
RHET1302015		1	1	1	1	3	5						4						1	17

“Blank” entries indicate that no grade was submitted. “X” is defined as incomplete, “NR” is defined as grade not received, “NC” is defined as no credit, “CR” is defined as credit and “W” is

defined as withdrawn from course. These data were collapsed into standard letter grades (no +/-) and percentages of grades earned in each course and section were calculated as shown in Table 3.

Table 3: Mid-Terms Grades for Selected Courses (in percent)							
CRSSEC	%A	%B	%C	%D	%F	%W	% blank
AHST1304001	36%	16%	16%	20%	11%	0%	0%
BA 2301502	15%	34%	35%	13%	1%	2%	0%
BIOL2111001	0%	0%	0%	0%	0%	0%	100%
CHEM2123101	90%	0%	5%	0%	0%	5%	0%
GOVT2301002	19%	43%	17%	11%	10%	1%	0%
MATH1325002	19%	19%	11%	13%	29%	8%	0%
PSY 2301001	24%	25%	28%	6%	16%	2%	0%
RHET1302015	12%	29%	29%	0%	24%	6%	0%

### Are Mid-term Grades Predictive of Final Grades?

Theoretically, mid-term grades account for about half of the final grades and are designed to give a true signal to the students as to their performance up to the mid point of the class. Mid-term grade feedback can be used by both the student and instructor to modify approaches to delivery and learning, or if happy with the mid-term outcome, continue with present behaviors.

One issue is with the fidelity of the mid-term grade signal. There is a commonly accepted anecdote that some professors purposefully deflate mid-term grades as a means to encourage students to work harder. Whether this is true and has the intended outcome remains to be seen. If one makes the assumption that this practice is widespread, then students cannot rely upon mid-terms to determine student performance by the end of class. One unintended effect could be the premature dropping of courses, thereby extending the time-to-degree of the student or in worse case, the student drops out of the major and/or the university. If mid-term grades are a false signal, from a faculty point-of-view, why bother giving them at all?<sup>1</sup>

Assuming the fidelity of the signal and that the mid-term accounts for 50% of the final grade, it seems likely that mid-term grades are strongly predictive of student success as measured by final grades (except of course in those courses where (1) no mid-term grades were issued or (2) where the grades were false signals and/or (3) where special extra work is back-loaded in the course). An analysis of grades issued to undergraduates for fall 2005 and spring 2006 yielded the results in Tables 3 and 4 below. Care should be used in interpreting spring 2006 results because of the number of instructors who did not comply with university policy to post mid-term grades – a point we will address later.

As one can see, in the fall semester, 72% of those students with a mid-term grade of A subsequently received a final grade of A; for spring, the percentage was 79%. For the fall

<sup>1</sup> Another held opinion is that the grade given is a matter between the student and the instructor and not the purview of the department, school or university.

semester, a mid-term grade of A was indicative in 94% of the cases of a final grade of A or B (for the spring term the result was the same). The variation around the mid-term grades is quite similar for the two semesters: for example, 86% of the students earning a C at mid-term finished with a B, C or D. The data demonstrate that the grade issued at mid-term, for the vast majority of course sections, was strongly predictive of the student's final grade in the class.

### **Evidence of Grade Change in the Core Courses**

An analysis was conducted on core courses, including math courses, offered in spring 2006. We were interested, especially, in courses where there were large changes in letter grades from mid-term to final. An increase or decrease was considered large if the grade jumped three or more letter grades, i.e. from a D to an A or an A to an F.

Twenty core courses, including all the core math courses, were selected for further analysis because they are vital to student success at UTD. The core courses selected for analysis were: ARTS 1301, AHST 1304, BIOL 1300, CHEM 1311, CHEM 1312, CS 2336, GOVT 2301, GOVT 2302, HIST 1301, HIST 1302, HUMA 1301, ISSS 3360, MATH 1325, MATH 1326, MATH 2312, MATH 2333, MATH 2417, MATH 2418, MATH 2419, MATH 2420, PHYS 2125, PSY 2301, and STAT 3332.<sup>2</sup> For the purpose of this analysis, only those students who received both mid-term and final grades were included. This would exclude graduate and non-degree seeking baccalaureates and would exclude those who withdrew before mid-terms were given. Those who withdrew after receiving their mid-term grades were included in a separate analysis. All subsections were added together to give an overall analysis of the course itself.

The analysis of the core courses selected above revealed that three courses showed unusual grade mid-term to final grade shifts (see Table 5). Twenty-five percent of the students in AHST 1304 improved their grades by two or more letters over their mid-term with 6% improving by three or more letter grades. Thirty-three percent of students in MATH 1326 improved their grades by two or more letter grades with 9% improving by three or more letter grades. Only 16% of students in MATH 2333 improved their grade by two or more letter grades but 8% improved their grade by three or more letters. These results can be compared to those in Table 4 below.

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<sup>2</sup> CGS 2301, a core course, would have been included in this analysis but no mid-term grades were issued for this class in spring 2006; therefore no analysis could be made.

**Table 3: Fall 2005 Mid-term and Final Grades for Undergraduates for Reporting Classes**

Final Grade	Mid-term Grade					Total
	A	B	C	D	F	
A	<b>11,641</b>	3,586	772	125	98	16,222
B	2,139	<b>5,318</b>	2,677	514	202	10,850
C	336	1,348	<b>2,465</b>	1,114	469	5,732
D	67	166	492	<b>602</b>	428	1,755
F	113	207	427	448	<b>1,446</b>	2,641
W	51	78	147	157	742	1,175

Final Grade	Mid-term Grade					Total
	A	B	C	D	F	
A	<b>72%</b>	<b>22%</b>	<b>5%</b>	<b>1%</b>	<b>1%</b>	<b>100%</b>
B	<b>20%</b>	<b>49%</b>	<b>25%</b>	<b>5%</b>	<b>2%</b>	<b>100%</b>
C	<b>6%</b>	<b>24%</b>	<b>43%</b>	<b>19%</b>	<b>8%</b>	<b>100%</b>
D	<b>4%</b>	<b>9%</b>	<b>28%</b>	<b>34%</b>	<b>24%</b>	<b>100%</b>
F	<b>4%</b>	<b>8%</b>	<b>16%</b>	<b>17%</b>	<b>55%</b>	<b>100%</b>
W	<b>4%</b>	<b>7%</b>	<b>13%</b>	<b>13%</b>	<b>63%</b>	<b>100%</b>

W = withdrawn from class

**Table 4: Spring 2006 Mid-term and Final Grades for Undergraduates for Reporting Classes**

Final Grade	Mid-term Grade					Total
	A	B	C	D	F	
A	<b>9,758</b>	1,875	531	78	50	12,292
B	3,330	<b>5,089</b>	2,377	463	169	11,428
C	235	1,069	<b>1,999</b>	952	394	4,649
D	42	138	358	<b>484</b>	383	1,405
F	68	158	269	330	<b>1,225</b>	2,050
W	25	74	120	146	581	946

Final Grade	Mid-term Grade					Total
	A	B	C	D	F	
A	<b>79%</b>	<b>15%</b>	<b>4%</b>	<b>1%</b>	<b>0%</b>	<b>100%</b>
B	<b>29%</b>	<b>45%</b>	<b>21%</b>	<b>4%</b>	<b>1%</b>	<b>100%</b>
C	<b>5%</b>	<b>23%</b>	<b>43%</b>	<b>20%</b>	<b>8%</b>	<b>100%</b>
D	<b>3%</b>	<b>10%</b>	<b>25%</b>	<b>34%</b>	<b>27%</b>	<b>100%</b>
F	<b>3%</b>	<b>8%</b>	<b>13%</b>	<b>16%</b>	<b>60%</b>	<b>100%</b>
W	<b>3%</b>	<b>8%</b>	<b>13%</b>	<b>15%</b>	<b>61%</b>	<b>100%</b>

W = withdrawn from class

**Table 5: Courses That Demonstrated Pronounced Changes from  
Mid-term Grades to Final Grades**

<b>Spring 2006 Mid-term to Final Grade Comparison</b>	<b>AHST1304</b>	<b>MATH1326</b>	<b>MATH2333</b>
Same Letter Grade	33	56	149
One Letter Above Mid-term	20	80	49
One Letter Below Mid-term	3	8	38
Two Letters Above Mid-term	15	53	31
Two Letters Below Mid-term	1	2	15
Three Letters Above Mid-term	4	17	11
Three Letters Below Mid-term	1	0	2
Four Letters Above Mid-term (F to A)	0	3	8
Four Letters Below Mid-term (A to F)	0	0	4
<b>Total Grades Recorded</b>	<b>77</b>	<b>219</b>	<b>307</b>
% Same	43%	26%	49%
% One Letter Difference	30%	40%	28%
% Two Letter Difference	21%	25%	15%
% Three or More Letter Difference	6%	9%	8%
<b>% Two or more Letters Above Mid-term</b>	<b>25%</b>	<b>33%</b>	<b>16%</b>
<b>% Two or more Letters Below Mid-term</b>	<b>3%</b>	<b>1%</b>	<b>7%</b>

For courses with more than one section, the data was disaggregated by section. Table 6 below presents the results.

**Table 6: Courses and Subsections That Demonstrated Pronounced Changes from  
Mid-term Grades to Final Grades**

<b>Spring 2006 Mid-term to Final Grade Comparison</b>	<b>AHST 1304-001</b>	<b>MATH 1325-001</b>	<b>MATH 1325-002</b>	<b>MATH 1325-501</b>	<b>MATH 1325-502</b>	<b>MATH 2333-001</b>	<b>MATH 2333-002</b>	<b>MATH 2333-501</b>	<b>MATH 2333-502</b>	<b>MATH 2333-503</b>
Same Letter Grade	33	25	34	13	21	29	32	50	14	24
One Letter Above Mid-term	20	25	14	7	0	10	11	5	20	3
One Letter Below Mid-term	3	0	4	0	18	8	14	9	2	5
Two Letters Above Mid-term	15	12	3	5	2	3	3	3	21	1
Two Letters Below Mid-term	1	0	0	0	6	6	1	6	0	2
Three Letters Above Mid-term	4	2	1	1	0	1	1	1	7	1
Three Letters Below Mid-term	1	0	0	0	3	0	0	2	0	0
Four Letters Above Mid-term (F to A)	0	1	0	0	0	1	4	1	1	1
Four Letters Below Mid-term (A to F)	0	0	0	0	0	2	0	2	0	0
<b>Total Grades Recorded</b>	<b>77</b>	<b>65</b>	<b>56</b>	<b>26</b>	<b>50</b>	<b>60</b>	<b>66</b>	<b>79</b>	<b>65</b>	<b>37</b>
% Same	43%	38%	61%	50%	42%	48%	48%	63%	22%	65%
% One Letter Difference	30%	38%	32%	27%	36%	30%	38%	18%	34%	22%
% Two Letter Difference	21%	18%	5%	19%	16%	15%	6%	11%	32%	8%
% Three or More Letter Difference	6%	5%	2%	4%	6%	7%	8%	8%	<b>12%</b>	5%
<b>% Two or more Letters Above Mid-term</b>	<b>25%</b>	<b>23%</b>	<b>7%</b>	<b>23%</b>	<b>4%</b>	<b>8%</b>	<b>12%</b>	<b>6%</b>	<b>45%</b>	<b>8%</b>
<b>% Two or more Letters Below Mid-term</b>	<b>3%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>18%</b>	<b>13%</b>	<b>2%</b>	<b>13%</b>	<b>0%</b>	<b>5%</b>

For AHST 1304, 25% of the students did remarkably better—moving up two letter grades from their mid-term, while in some of the MATH courses, over 12% of the students collapsed two or more letter grades between the mid-term and final grades.

### The Importance of True Signaling

If using mid-term grades in other than a true signal modality is practiced among instructors, it may in fact cause more harm than good, especially for students who might have accomplished D or C quality work but received an F at mid-term. It is clear that students who receive F's at mid-term are more likely to withdraw from the class or if they stay, are least likely to improve their grade. There is a great danger that giving a mid-term grade of F to a student that did not deserve such a grade can cause that student to withdraw from the course or to give up. Of those students who withdrew after fall mid-terms, 63% had received an F at mid-term. Of those students who withdrew after spring mid-terms, 61% had received an F at mid-term. Of the 3,385 F's issued at fall mid-term, 43% remained F's at semester's end. Of the 2,802 F's issued at spring mid-term, 44% remained F's at semester's end. In contrast, 20% of the D's issued at fall and spring mid-terms remained D's by the final. Furthermore, 13% of those who withdrew in fall and 15% of those who withdrew in spring had received a D at mid-term.

The following two tables provide the percentage of grades that improved, remained the same or declined since mid-term and include withdrawal rates. What is important is the percentage of students who improved from mid-term to final: for example, for spring, 61% of those students with a D at mid-term managed to improve their grade. Students who received C's and D's were more likely to improve their grades, while students who received A's and B's were more likely to maintain their grade level. Students who received F's were more likely to earn F's at final or to withdraw.

**Table 7: Fall 2005 Mid-term and Final Grades for Undergraduates for Reporting Classes**

Final Grade	Mid-term Grade				
	A	B	C	D	F
A	11,641	3,586	772	125	98
B	2,139	5,318	2,677	514	202
C	336	1,348	2,465	1,114	469
D	67	166	492	602	428
F	113	207	427	448	1,446
W	51	78	147	157	742
<b>Total</b>	14,347	10,703	6,980	2,960	3,385

W = withdrawn from class

**Fall 2005 Performance at Final**

Final Grade	Mid-term Grade				
	A	B	C	D	F
Improved	--	34%	49%	59%	35%
Same	81%	50%	35%	20%	43%
Declined	19%	16%	13%	15%	--
Withdrew	0%	1%	2%	5%	22%
<b>Total</b>	100%	100%	100%	100%	100%

**Table 8: Spring 2006 Mid-term and Final Grades for Undergraduates for Reporting Classes**

Final Grade	Mid-term Grade				
	A	B	C	D	F
<b>A</b>	<b>9,758</b>	1,875	531	78	50
<b>B</b>	3,330	<b>5,089</b>	2,377	463	169
<b>C</b>	235	1,069	<b>1,999</b>	952	394
<b>D</b>	42	138	358	<b>484</b>	383
<b>F</b>	68	158	269	330	<b>1,225</b>
<b>W</b>	25	74	120	146	581
<b>Total</b>	13,458	8,403	5,654	2,453	2,802

W = withdrawn from class

**Spring 2006 Performance at Final**

Final Grade	Mid-term Grade				
	A	B	C	D	F
<b>Improved</b>	--	22%	51%	61%	36%
<b>Same</b>	73%	61%	35%	20%	44%
<b>Declined</b>	27%	16%	11%	13%	--
<b>Withdrew</b>	0%	1%	2%	6%	21%
<b>Total</b>	100%	100%	100%	100%	100%

### **Evaluation of Student Performance Using Mid-term Grades: Possibilities for Raising Student Success and Retention**

The underlying rationale for posting mid-term grades is to allow for an organizational response both to students who are doing well and those who are doing poorly. Mid-term grades provide the university with a potent tool for early intervention and direction of resources to enhance student success.

At the extreme, in every semester, there are freshmen who, for a variety of reasons, are failing three or more courses after mid-term. The following tables (9 & 10) provide demographic information about these freshmen who were failing three or more courses by mid-term. The bulk of the students experiencing difficulty have declared majors in the schools of Engineering and Computer Science and Natural Science and Mathematics. The top majors of these troubled students are Art & Technology, Biology, Business Administration, Computer Science and Software Engineering. Unsurprisingly, a significant number of these students are undeclared. It is difficult to determine if the decline in the number of students failing three or more courses from fall to spring is due to better performance by students, the fact that some students are already lost to the university (i.e., they dropped out) or to the fact that some instructors did not submit mid-term grades and hence the data were unavailable.<sup>3</sup>

<sup>3</sup> The Biology Department's mid-term grades for the spring 2006 semester were not in SIS+.

**Table 9: Freshmen Failing Three or More Courses by Count of Failing Courses**

Courses	F05		S06	
	N	%	N	%
<b>3</b>	29	45%	38	68%
<b>4</b>	22	34%	15	27%
<b>5</b>	8	12%	3	5%
<b>6</b>	5	8%	0	0%
<b>7</b>	1	2%	0	0%
<b>Total</b>	<b>65</b>	<b>100%</b>	<b>56</b>	<b>100%</b>

**Table 10: Freshmen Failing Three or More Courses by School**

School	F05		S06	
	N	%	N	%
Arts & Humanities	7	11%	8	14%
Behavioral & Brain Sciences	3	5%	1	2%
Engineering & Computer Science	18	28%	24	43%
General Studies	0	0%	0	0%
Management	5	8%	9	16%
Natural Science & Math	15	23%	6	11%
Social Sciences	5	8%	1	2%
Undeclared	12	18%	7	13%
<b>Total</b>	<b>65</b>	<b>100%</b>	<b>56</b>	<b>100%</b>

**Table 11: Freshmen Failing Three or More Courses by Major**

Major	F05		S06	
	N	%	N	%
Accounting & Information Management	1	2%	2	4%
Arts & Humanities	1	2%	0	0%
Art & Technology	5	8%	7	13%
Biochemistry	3	5%	1	2%
Biology	8	12%	4	7%
Business Administration	4	6%	7	13%
Chemistry	3	5%	1	2%
Computer Science	13	20%	14	25%
Economics	2	3%	1	2%
Electrical Engineering	4	6%	3	5%
Government	3	5%	0	0%
History	0	0%	1	2%
Literature	1	2%	0	0%
Molecular Biology	1	2%	0	0%
Neuroscience	2	3%	0	0%
Psychology	1	2%	1	2%
Software Engineering	1	2%	6	11%
Telecommunications Engineering	0	0%	1	2%
Undeclared	12	18%	7	13%
<b>Total</b>	<b>65</b>	<b>100%</b>	<b>56</b>	<b>100%</b>

Table 12 below compares the freshmen who were failing three or more courses at mid-term with the FTIC freshmen as a whole. For the purpose of comparison, the freshmen in trouble have been labeled the “Intervention Group.” As one can see it appears that males are more likely than females to find themselves “at risk.” African-Americans, especially males, are disproportionately represented in the troubled group whereas Asian-Americans are under-represented. Hispanic and Anglo students form intermediate groupings. These and other data suggest that it may be that an “academic bridge” like support program needs extension into the freshman year.

**Table 12: Characteristics of Intervention Groups Compared to Freshman Profiles**

Characteristics	Fall 2005 Freshmen*		Fall 2005 Intervention Group		Spring 2006 Freshman*		Spring 2006 Intervention Group	
	No.	%	No.	%	No.	%	No.	%
Male	670	63%	50	77%	642	64%	47	84%
Female	387	37%	15	23%	368	36%	9	16%
White	650	61%	38	58%	617	61%	35	63%
<i>Male</i>	433		29		412		32	
<i>Female</i>	217		9		205		3	
African-American	47	4%	10	15%	43	4%	6	11%
<i>Male</i>	28		8		25		5	
<i>Female</i>	19		2		18		1	
Asian-American	238	23%	10	15%	233	23%	8	14%
<i>Male</i>	140		8		138		6	
<i>Female</i>	98		2		95		2	
Hispanic	86	8%	7	11%	82	8%	7	13%
<i>Male</i>	50		5		48		4	
<i>Female</i>	36		2		34		3	
International	27	3%	0	0%	26	3%	0	0%
<i>Male</i>	15		0		15		0	
<i>Female</i>	12		0		11		0	
Native American	5	1%	0	0%	5	1%	0	0%
<i>Male</i>	2		0		2		0	
<i>Female</i>	3		0		3		0	
Unknown	4	<1%	0	0%	4	<1%	0	0%
Headcount	1057		65		1010		56	

\*First-time in college undergraduates as of fall 2005.

This intervention list shows that freshman males are disproportionately more likely to struggle with failure in three or more classes than freshman females. This trend was noticeable within all ethnic groups. It also shows that Asian-American students are the least likely to fail three or more classes.

In contrast to the above, the data in Table 13 below indicate that on the whole, undergraduate students at this university perform well in their courses at the mid-term point.

**Table 13: Distribution of Mid-Term Grades (in percent)**

Semester	Number of Course Sections	A	B	C	D	F	W	No Grade Reported
Fall 2005*	1053	35%	26%	17%	7%	8%	1%	4%
Spring 2006	989	32%	27%	15%	7%	8%	1%	10%

\* Grades such as CR, NC, NG, NR and X comprised the remaining 2%

**Focusing on the spring 2006 semester, there were 93 course sections taught by 63 instructors that recorded mid-term failure rates of 20% or greater.** These courses yielded 1,098 F's out of 3,706 or 29.6% of possible grades. This can be compared with the total mid-terms grades submitted. For spring 2006, 33,483 grades were submitted and of these 2,757 were Fs (8.2%) and 1,061 were withdrawals (3.2%). Thus, these high-failure rate courses (defined by mid-term grades) comprise about 10% of all course sections but account for 40% of the F's issued at mid-term.<sup>4</sup>

For the final spring grades, 36,689 letter grades were submitted. Of these grades, 10.1% were from the 93 high failure rate courses. **These 93 courses resulted in a withdrawal rate of 8.9%, which is twice as high as the overall withdrawal rate of 4.3%. The failure rate for these 93 courses was 15.6 % --two and one half times higher than the overall failure rate of 6.2%.**

Thirty-one percent, or 29, of these courses were 1000 level, or freshman level, courses and 22.6% or 21 courses were 2000 level. That is, **over 50% of these courses are gateways to successful completion of the basic requirements.** Key core courses and introductory courses for science and engineering majors comprise this list.

For the high-failure rate 1000 level courses, 31% of all grades given at mid-term were F; for these same courses, 24% of all final grades were F or W. Almost all of the 7% positive variance between mid-term F's and final W and F grades is accounted for by a single instructor. The Math courses 1325, 1326 and 1314 generate 38.5% of the failing mid-term grades but only 27.5% of the final W's and F's. On the other hand, student performance in RHET 1301 went from a 23.9% failure rate at mid-term to over 28% withdrawal and failure rate after finals.

In terms of spring core courses, there were 156 core course sections offered in spring 2006. Three courses – CGS2301001, CHEM1312002 and ECO2301001 – did not submit mid-term grades as of March 28, 2006,<sup>5</sup> resulting in mid-term grades for these courses being “blank.”

Table 14 compares the mid-term grade distribution for the 156 core courses to the total undergraduate course sections for spring.

<sup>4</sup> There were 4,213 blank entries where instructors did not record midterms.

<sup>5</sup> This decision affected 221 students who may not have received timely feedback on their progress. Data on whether the students received individual feedback does not exist.

**Table 14: Distribution of Mid-Term Grades**

Spring 2006 Semester	# of Course Sections	A	B	C	D	F	W	No Grade Reported
Core Sections	156	27%	24%	19%	10%	15%	2%	3%
All Undergraduate Sections Reporting	989	32%	27%	15%	7%	8%	1%	10%

The total mid-term grade tally for these 156 core course sections was as follows: 27% recorded A's, 24% recorded B's, 19% recorded C's, 10% recorded D's, 15% recorded F's, with 3% blank and 2% withdrawals. The core math courses recorded the highest numbers of failing mid-term grades, accounting for 39% of the recorded F's in the core course group. The government core courses are second in the number of recorded F's but these courses only account for 10% of all F's recorded in the core course group.

Table 15 compares the mid-term and final grades for the spring 2006 core courses. At mid-term, 17% of the grades were W or F and at final grade 17% of the grades were W or F. The most remarkable shifts appear in the "A" range. While, this is partially due to a percentage of the "blanks" mid-term grades being "A", it does appear that as a result of mid-term feedback, students responded positively.

**Table 15: Comparison of Core Mid-Term and Final Grades**

Spring 2006 Semester Grades	Number of Course Sections	A	B	C	D	F	W	No Grade Reported
Mid-Term	156	27%	24%	19%	10%	15%	2%	3%
Final	156	36%	25%	16%	7%	11%	6%	0%

As noted above, the Math courses 1325, 1326 and 1314 generate a large percentage of final grades of W's and F's. Similarly, fifty-seven percent of the 2000 level high failure rate classes are in mathematics. Twenty-nine percent of the students enrolled in these 2000 level courses (e.g., Math 2417) were failing at mid-term and by finals, 20% had failed and over 10% had withdrawn.<sup>6</sup>

The following courses experienced failure rates that met or exceeded 20% in fall 2005 and in spring 2006: College Algebra; Applied Calculus I; Applied Calculus II; Precalculus; Matrices, Vectors and Applications; Calculus I and Calculus II. Four instructors taught only in the fall, four taught only in the spring and seven taught both semesters. This group of instructors includes ten senior lecturers, three lecturers and an associate professor as the primary instructor listed. All of these courses have online syllabi for students to consult. There is a great deal of consistency with the structure and requirements of the syllabi.

What are the possible variables that contribute to the high failure rate in core math courses at UTD? The data, though limited, suggest that some of the likely factors contributing to failure rates are a) quality of student preparation and student expectations, b) instruction, c) course

<sup>6</sup> Note that none of these students would have been able to fill out a course evaluation form.

organization and assignments, d) course delivery, e) educational supplemental support and/or a combination of the above.

There is some evidence that first time freshmen from selected area high schools are differentially ready for UTD's more rigorous academic environment. Understanding which high schools might not be adequately preparing their students for college-level mathematics can enable advisors to provide better assistance for the students. Advisors might wish to advise students, regardless of major, to be conservative when selecting math courses. Students from some of these feeder schools might wish to consider taking college algebra their first year rather than applied calculus or calculus to ensure initial success and integration into UTD's more rigorous academic environment. Moreover, in many high schools homework assignments are mandatory and count toward a final grade. Faced in college with classes that have voluntary, non-graded assignments not counted as part of the final grade, students may naively believe that the homework is not necessary. This may be amplified by the fact that some classes do require and grade homework thus focusing the student's resources on the assignments "that matter." Thus, it may be that an interaction between the collective preparation and expectations of students developed in high school and the curriculum delivery at UTD creates a greater potential for failure.

Math instructors encourage students to visit the MATH Lab located at MC 2.412 and to work with the instructors' teaching assistants. Instructors permitted the limited use of scientific calculators and wholly forbade the use of graphing calculators. Answers that do not show the work were not accepted.<sup>7</sup> Attendance was mandatory and there were no make-up quizzes, assignments or exams. Thus, students who failed to attend quizzes and exams earned a zero. Homework for nearly all of these courses was optional and was neither turned in nor graded. However, it appears that completion of the work is essential practice to ensure success in the quizzes and tests. Instructors might wish to make homework assignments mandatory rather than voluntary to improve success rates in their classes. In mathematics, this will require students to practice their calculus and algebra skills and let go of any poor math habits they might have learned in high school. However, mandatory weekly assignments mean that additional educational support resources will need to be provided both to aid the students and to aid the instructors create a culture of success.

As suggested above, organizationally, it is not clear that freshman students are prepared for this type of delivery system. Many high schools do not conduct their instruction in a similar way. Some high school mathematics classes allow the use of graphing calculators to complete the work. The TAKS and TEKS tests, mandatory state tests that enable promotion and graduation of students, also allow graphing calculators, also known as graphical calculators, in the testing room. Many graphing calculators can perform complex arithmetic and calculus functions such as factor/expand, simplify, perform simultaneous equations, solve systems of linear equations and so on. Many countries do not permit the use of these devices in their schools for this reason. Note that International Baccalaureate (IB) schools do not permit the use of such calculators in

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<sup>7</sup> Theoretically, a student can submit a quiz that has all the correct answers but, if no work is shown, the student fails the quiz.

their coursework. Garland High School, Plano East Senior High School, Trinity High School in Euless and Lawrence D. Bell High School in Hurst are four local schools that are IB schools.<sup>8</sup>

Finally, Table 16 below demonstrates that core math sections have large enrollments relative to core Rhetoric sections. Given the critical nature of success in math for success in the sciences and engineering, freshman retention and graduation, the university may want to examine the curriculum delivery mechanisms for core math courses.<sup>9</sup> Larger lecture sections may be a contributing factor in the optional homework requirement. A more careful placement of students in smaller sections, with more hands-on instruction and peer support might result in better outcomes.

Course	Course Name	Sections	Average Enrollment
RHET1101	Oral Comm. Critical Thinking	4	10
RHET1302	Rhetoric	29	15
MATH1306	College Algebra Non Scientist	2	56
MATH1314	College Algebra	2	63
MATH1325	Applied Calculus I	4	62
MATH1326	Applied Calculus II	4	64
MATH2312	Precalculus	2	74
MATH2333	Matrices, Vectors with App	5	64
MATH2417	Calculus I	4	76
MATH2418	Linear Algebra	2	50
MATH2419	Calculus II	5	63
MATH2420	Differential Equations with App	1	71
MATH2451	Multivariable Calculus with App	1	68
MATH2V90	Topics in Math	1	23

### Posting of Mid-term Grades: Issues in Compliance

The Faculty Senate instituted mid-term grades for all undergraduates. Posted mid-term grades provide an organizational mechanism to identify students at risk and to organize conjoint student-institution resources for intervention. A small cadre of instructors did not submit spring 2006 mid-term grades. The Senate required that all instructors who taught undergraduate-level courses to submit mid-term grades for their undergraduate students no later than March 10, 2006. As of April 5, 2006, fourteen professors, fifteen associate professors, six assistant professors, six senior lecturers, fifteen lecturers, four teaching assistants and four instructors classified as

<sup>8</sup> Mandatory testing has become a permanent reality in Texas high schools. The mandatory state exit exams for high school students emphasize algebra and geometry concepts, the minimum required by the state to graduate high school. The older variation of this exam was known as TAKS (Texas Assessment of Knowledge and Skills); the later version is known as TEKS (Texas Essential Knowledge and Skills). Preparation materials for high school instructors can be found at [www.tea.state.tx.us/teks/](http://www.tea.state.tx.us/teks/). The exams are multiple choice and do not require students to show their work.

<sup>9</sup> While it may be that the Rhetoric sections would be larger were it not for the computer-based delivery system, the fact remains that students in Rhetoric experience smaller class sections.

“other” did not submit mid-term grades for their classes. Notable amongst the tenured and on-track faculty were faculty in the Biology Department and in the School of Engineering and Computer Science. This pattern also held true for the non-tenured track instructors. The four teaching assistants who did not submit mid-term grades were in the School of Social Sciences. While it is possible to infer that the lecturers, teaching assistants and other temporary instructors were not properly briefed on mid-term grade responsibilities by their administrators, the same cannot be said for the tenured and on-track faculty, most of whom had submitted mid-term grades during the previous semester. For all of these instructors there is no data on the degree to which individual students did or did not have timely feedback.

### **Concluding Observations**

To improve retention and graduation rates among new freshmen, the university must focus on ensuring that students pass their core math classes. By requiring and grading homework assignments and offering more proactive assistance through the Math Lab, any deficiencies the students might bring with them from high school can be overcome. Alteration in the course delivery system, while requiring an investment of resources and conscientious oversight, could raise success rates and thus retention and graduation rates. Other data suggests that we may need a better understanding of the student’s initial capacity to handle UTD’s core math courses and a more informed, proactive advising process. Students – particularly students who are ranked lower than top 10% in their high school classes and especially students who ranked lower than top 20% regardless of SAT math scores – may not be ready for the university’s current math delivery system and academic environment.

The university must also devise a better system to evaluate instruction and instructors, especially those who consistently preside over high failure rates in their classes and who instruct several courses that show high failure rates, particularly in introductory and core course offerings. Relying only upon post-facto satisfaction surveys that are distributed at the end of the semester will not capture the observations of students who withdraw from courses after mid-term. Satisfaction surveys, while an important measure, can only tell part of a story about a teacher’s effectiveness. Peer comparisons within departments and within courses taught in multiple sections can provide evidence of effectiveness as well.

Finally, it is important that all departments implement measures to provide early feedback to undergraduate students in general and freshmen in particular. Mid-term grades are critical, but feedback really should be available much earlier for interventions to be successful. Such important feedback is critical to lower division students who are otherwise unsure of their abilities in a college setting and might require counseling from their advisors. Advisors cannot intervene to help struggling students if neither the student nor the advisor knows of that student’s academic status. Furthermore, when instructors do provide mid-term grades, those grades should accurately reflect the true quality of the work. For its part, the advising system must be as proactive as possible aimed at creating a culture of student success and academic excellence.

The mid-term grade initiative is an important step toward improving first year retention rates and hence improving graduation rates. Successful use of the data should reduce the number of classes

that students re-take due to previous failures, improve student academic standings, and retain students in science and engineering majors.

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