Session :

Curriculum Outcome Assessment using Subject Matter on the FE Examination.

Enno "Ed" Koehn, Ramakanth Mandalika

Lamar University

Abstract:

In engineering education, assessment has become a major topic as a result of the adoption of EC 2000 by The Accreditation Board for Engineering and Technology (ABET). In particular, the utilization of a nationally-normed examination is one method recommended by the ABET criteria¹. In this regard, an effective and recognized tool for assessing engineering education is the Fundamentals of Engineering (FE) examination developed by the National Council of Examiners for Engineering and Surveying (NCEES). In this study, the findings of a detailed analysis of FE examination data of the students at Lamar University is conducted and presented in various forms. The investigation includes a discussion concerning the FE as an effective assessment tool and the development of a database of FE examination results. Fundamentals of Engineering examination data are presented in several forms to evaluate engineering student performance. First, a comparison of grades in individual subject areas (e.g chemistry, computers, dynamics, fluid mechanics, mathematics etc.) is conducted relative to the national average. This provides assessment information for a particular institution. Overall, the findings of the study indicate that the use of the subject matter on the FE exam to measure student performance yields considerable data for comparison purposes which may be utilized to asses and improve an engineering program.

I. Introduction:

Among the most significant obstacles facing universities, today, is related to developing quantitative measures for evaluating engineering student performance and tracking the effect of program changes in the curriculum⁹. Gaining faculty acceptance for the evaluation methodology utilized is also important. Here, many of the difficulties result from a lack of available uniform performance measures, across institutions. Presently, the only available uniform performance measure taken by a large number of students from many institutions is the Fundamentals of Engineering (FE) examination. Unfortunately, many educators and university administrators are principally concerned with only the overall pass rate on the FE examination. Numerous institutions use this single number as a performance measure for engineering programs^{5,6,8}. For

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example the Texas Legislature has recommended that Texas Universities should be funded by a formula based, in part, on the student pass rate on the FE examination¹².

II. FE exam as an assessment tool:

The Fundamentals of Engineering examination is used, in part, as the first step in the professional licensing of engineers and was developed to measure minimum technical competence^{2,4,10}. It is a pass/fail exam that is taken by approximately 50,000 people a year, most of whom are recent college graduates or seniors within one year of graduation. Although the exam results do provide specific data on performance in a given subject, this information is not used for licensing. The data can, however, be utilized to make comparisons and conclusions, some of which may or may not be valid. Most importantly, the FE exam results also provide information concerning the achievement of students taking the test relative to state and national averages.

In fact, the FE examination is the only nationally-normed exam that addresses specific engineering topics, which makes it an extremely attractive tool for use as part of an assessment process. Furthermore, the format of the FE exam was recently changed with the express purpose of making it more useful for outcomes assessment. Specifically, discipline specific sections for chemical, civil, electrical, industrial, and mechanical engineering were developed to include subjects from upper level courses --- topics that were not appropriate when students from all engineering disciplines took the same exam. This was done to better measure students knowledge of subjects taught in junior and senior level engineering courses. In addition to the above, the FE exam is currently under revision by the National Council of Examiners for Engineering and Surveying to increase its utility as a program evaluation tool.

FE exam results may be used to assess the following subject areas as specified in the ABET criterion.

- a) An ability to apply knowledge of mathematics, science and engineering.
- b) An ability to design and conduct experiments, as well as to analyze and interpret data
- c) An ability to design a system, component, or process to meet desired needs
- d) An ability to identify, formulate and solve engineering problems
- e) An understanding of professional and ethical responsibility
- f) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Some of the aforementioned subject areas may be covered in either or both the morning or afternoon sessions.

III. FE Pass Rate:

Although the FE exam provides some means of assessment, there are both advantages and disadvantages of using the exam as an assessment tool; therefore, its widespread use as such should be viewed with caution. The FE exam should not be used to determine the curricular

content of a program—its original purpose is to test, in part, competency for licensure. In addition, the exam is not intended to force programs to be similar. For licensure purposes, the total score is used rather than the score in any specific subset of questions. Passing the exam does not show the competence in all subjects but instead shows an average minimum level of competency in several subject areas.

As mentioned, one of the major errors that could be made in using the FE exam as an assessment tool is focusing on the percentage who pass the exam⁹. This criterion is too broad to be effective in improving sub-discipline instruction. More specific measures are needed. Too often, the passing rates of individual programs are compared with those of other institutions, and these rates become more important than the subjects to be evaluated. In such a situation, the focus becomes "teaching to the exam" and not truly assessing the subject matter in the curriculum. In any case, institutions must remember that the original primary purpose of the FE is to assess minimal technical competencies of the various individuals sitting for the examination.

IV. FE Subject areas:

A database of FE examination scores for Civil Engineering students at Lamar University has recently been developed. The data for the six years between 1998 and 2003 was extracted from the NCEES documentation³. With this information, the average scores of students from Lamar University can be compared with the national averages. Tables 1-4 show the grades for each subject (e.g Chemistry, Computers, Dynamics, Electrical Circuits, Fluid Mechanics, Ethics, Statics etc.) for both the morning and the afternoon general examination sessions. Comparing the data between Tables 1 & 2, and that of Tables 3 & 4, it can be seen that Lamar University results tend to be above the national average for many subject areas. For example, in the 2003 morning exam, shown in Tables 1&2, Lamar students performed above the national average in these subjects: Chemistry (82.0% / 63.5%), Electrical Circuits (50.0% / 39.5%), Ethics (86.7% / 68.5%), Fluid Mechanics (54.7% / 53.0%), Mathematics (76.3% / 64.0%) and Thermodynamics (48.3% / 44.5%).

In order to reduce the volume of data and eliminate the importance of a single examination, threeyear averages (2001 to 2003 and 1998 to 2000) were calculated. The results are illustrated in Tables 5-8. A comparison between Tables 5 & 6 indicates that the Lamar Civil Engineering scores tend to be generally higher than the national average for the morning examination. In fact, for the 2001-2003 time period, Lamar students earned lower scores in only three subject areas: Engineering Economy (62.2% / 64.7%), Material Science (48.8% / 53.5%) and Thermodynamics (43.1% / 47.0%). A comparison of the findings in Tables 7 & 8 for the afternoon general examination, however, show that the grades of Lamar students are generally lower than the national average for numerous subject areas. As an example, for the 2001-2003 time period Lamar students performed above the national average in only five of the twelve subjects under consideration. The ratio of the scores for the various subject areas, earned by students of Lamar University compared to the national scores, for both the morning and afternoon sessions was also calculated. Here, a ratio of greater than unity indicates that the Lamar scores exceed the national averages. This approach is recommended by the NCEES as a method to illustrate and compare the performance of the students in a specific department¹¹. For example, Table 9 illustrates that the Civil Engineering scores for 2001-2003 in Engineering Economy (0.96), Material Science/Structure of Matter (0.91) and Thermodynamics (0.92) were below the national average. Nevertheless, Table 10, the afternoon exam, shows for the three subjects under consideration that except for Material Science/Structure of Matter (0.90), Engineering Economy (1.06) and Thermodynamics (1.09) are above average.

Table 11 illustrates the data for the six-year period between 1998 - 2003. The findings show that the ratio for all subjects is greater than unity for morning exam. This indicates that the Civil Engineering students have performed better than the national average for this test. However, in the afternoon, only four subjects are above the national values. These findings show that for many students the afternoon general exam is more difficult than the morning test.

V. Summary and Conclusions:

One of the methods of assessment listed in the ABET criteria is student performance on nationally-normed examinations. The NCEES has developed, over the years, the FE examination, which is designed, in part, to satisfy the professional licensing process. In addition, the FE examination, today, is the only nationally-normed exam that addresses specific engineering topics. This makes it an extremely attractive tool for use as part of the assessment process for an engineering institution. However, it must be noted that the FE test was originally designed to measure minimal technical competency.

Lamar University has been utilizing the FE exam for numerous years. In fact, 524 students have sat for the examination since 1980. Data indicates that the pass rate of this group is 94.59%. From 1986 the pass rate of various disciplines was recorded by the College of Engineering. Since that time, 115 Civil Engineering students have taken the examination with an overall pass rate of 94.8%. This data must be transmitted, yearly, to the Texas State Legislative Board⁷.

The NCEES recommends that the pass rate should not be utilized for assessment purposes. It is believed that a comparison of performance in individual subject areas yields more consistent results. Taking this concept under consideration, the department developed documentation that tabulates the Civil Engineering score in various subjects compared to the national scores in the identical subject areas. In addition, the ratios of the individual departmental scores to the national scores were calculated as shown in Tables 9-11. Utilizing this approach a ratio of equal to or greater than one indicates that the performance of Lamar students is equal to or exceeds the national average.

The faculty of the Civil Engineering department is considering establishing a goal that the ratio for each subject area should be equal to or greater than unity for either the morning or afternoon

examination. The findings in Table 11 indicate that this has been accomplished, on average, in the morning exam for the six years between 1998-2003. Nevertheless, the afternoon ratios indicate that these exams have been more difficult for the students. However, Tables 9 & 10 show the goal has not been met for the three-year period, 1998-2000. Specifically, chemistry (0.94 / 0.76), dynamics (0.94 / 0.89) and mathematics (0.98 / 0.75) do not meet the criteria. However, these problems were solved during the 2001-2003 time period. Nevertheless, Material Science/Structure of Matter (0.91 / 0.90) does not meet the goal for 2001-2003. A new faculty member has been hired in the materials area which should solve this problem. Overall, the findings of this investigation indicate that the use of the FE exam to measure student performance yields considerable data for comparison purposes which may be utilized to assess and improve an engineering program.

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Enno "Ed" Koehn

Enno "Ed" Koehn is a Professor of Civil Engineering at Lamar University, Beaumont, Texas. Professor Koehn has served as a principal investigator for several research and development projects dealing with various aspects of construction and has experience in the design, scheduling and estimating of facilities. In addition, he has authored/co-authored over 200 papers and presentations in engineering education and the general areas of Civil and Construction Engineering. Dr.Koehn is as member of ASEE, AACE International, ASCE, NSPE, Chi Epsilon, Tau Beta Pi, and Sigma Xi and is a licensed Professional Engineer and surveyor.

Venkata.R.Mandalika

Venkata.R.Mandalika is currently a graduate student of Civil Engineering at Lamar University, Beaumont, Texas. He has served as a Research Assistant at Chaitanya Bharathi Institute of Technology (C.B.I.T), Hyderabad, India. In addition, he has authored/co-authored 10 technical papers at various national and international conferences in the field of Civil Engineering. Mr.Venkata is a member of ASCE, ISTE New Delhi – India, and Chi Epsilon.

	Table 1.	Lamar C	ivil Eng	ineering	Grades:	Morning	session	D)							
SUBJECT	Oct-03	Apr-03	AVG	Oct-02	Apr-02	AVG	Apr-01	AVG	Oct-00	Apr-00	AVG	Oct-99	AVG	Apr-98	AVG
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CHEMISTRY	82	82	82.0	55	59	57.7	73	73	45	64	49.8	59	59	45	45
COMPUTERS	71	36	47.7	71	50	57.0	100	100	43	29	39.5	79	79	57	57
YNAMICS	78	56	63.3	56	67	63.3	78	78	70	33	60.8	61	61	33	33
LECTRICAL CIR.	50	50	50.0	33	38	36.3	58	58	61	42	56.3	42	42	42	42
NGINEERING ECO.	60	20	33.3	80	70	73.3	80	80	100	40	85.0	70	70	80	80
THICS	100	80	86.7	40	60	53.3	80	80	53	80	59.8	85	85	100	100
LUID MECHANICS	38	63	54.7	50	56	54.0	75	75	38	75	47.3	66	66	75	75
AT SCI/ STR MAT.	75	38	50.3	25	19	21.0	75	75	71	63	69.0	72	72	75	75
MATHEMATICS	79	75	76.3	79	71	73.7	58	58	58	54	57.0	67	67	50	50
NECH OF MATL.	63	56	58.3	50	75	66.7	75	75	67	38	59.8	50	50	75	75
STATICS	50	58	55.3	75	75	75.0	58	58	67	50	62.8	85	85	75	75
HERMODYNAMICS	45	50	48.3	45	45	45.0	36	36	61	55	59.5	50	50	45	45
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	60	62	61.0	54	56	55	61	61	56	47	51.5	58	58	55	55
LECTRICAL CIR.	37	42	39.5	38	42	40	56	56	37	41	39.0	41	41	45	45
NGINEERING ECO.	63	59	61.0	69	67	68	65	65	56	58	57.0	57	57	61	61
THICS	63	74	68.5	66	62	64	80	80	74	73	73.5	80	80	80	80
LUID MECHANICS	55	51	53.0	55	55	55	67	67	43	58	50.5	57	57	62	62
AT SCI/STR MAT.	55	52	53.5	48	48	48	59	59	49	49	49.0	60	60	54	54
ATHEMATICS	64	64	64.0	57	63	60	57	57	52	55	53.5	60	60	64	64
IECH OF MATL.	62	57	59.5	57	57	57	64	64	41	49	45.0	55	55	55	55
STATICS	55	56	55.5	64	64	64	49	49	54	44	49.0	71	71	59	59
HERMODYNAMICS	44	45	44.5	43	46	44.5	52	52	38	45	41.5	45	45	50	50
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SUBJECT	Table3.	Lamar C Apr-03	ivil Engi AVG	neering	Grades:	Afternoo AVG	Apr-01	al Exam AVG	ination Oct-00	Oct-00	AVG	Oct-99	AVG	Apr-98	AVG
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CHEMISTRY COMPUTERS COMPUTERS COMPUTERS COMPUTERS COMPUTERS COMPUTERS COMPUTERS COMPUTERS COMPUTERS COMPUTERS COMPUTERS COMPUTERS		Apr-03 50 50 30 8 50 67 46 63 42 33 Nationa Apr-03 50 76 37	AVG 2003 50 50 30 8 50 67 46 63 42 33 33 I Grades AVG 2003 50 76 37		Apr-02 50 50 10 33 67 50 33 75 63 58 42 58 42 Apr-02 39 59 39	AVG 2002 50 50 10 33 67 67 50 33 75 63 58 42 42 eral Exal AVG 2002 39 59 39	Apr-01 20 67 60 17 33 67 25 33 50 50 100 67 nination Apr-01 57 63 40	AVG 2001 200 67 60 17 33 67 25 33 50 50 50 100 67 67 40 8 40	Oct-00 33 67 40 67 56 78 50 67 33 17 72 33 Oct-00 44 36 40 40 40 40 40 40 40 4	20 67 0 17 33 100 50 33 25 75 83 50 50 Oct-00 43 56 34	2000 29.8 67.0 30.0 54.5 50.3 83.5 50.0 58.5 31.0 31.5 74.8 37.3 37.3 37.3 48.0 2000 43.5 46.0 37.0	35 58 45 21 58 75 63 75 63 75 40 44 47 9 46 Oct-99 40 56 45	1999 35 58 45 21 58 75 63 75 63 75 40 44 40 44 49 946 80 80 999 40 56 45	40 33 20 50 0 100 25 0 42 25 50 33 33 Apr-98 54 65 25	1998 40 33 20 50 0 100 25 50 42 25 50 33 33 4VG 1998 54 65 54
CHEMISTRY COMPUTERS COMPUTERS COMPUTERS COMPUTERS CLECTRICAL CIR. COMPUTERS CLUID MECHANICS CAT SCI/STR MAT. CATHEMATICS MECH OF MATL. CTATICS HERMODYNAMICS COMPUTERS COMPUTERS COMPUTERS COMPUTERS COMPUTERS COMPUTERS COMPUTERS		Apr-03 50 50 30 8 50 67 46 63 42 33 National Apr-03 50 76 37 37	AVG 2003 50 50 30 8 50 67 46 63 42 33 3 1 Grades AVG 2003 50 67 46 63 37 37		Apr-02 50 50 10 33 67 67 50 33 75 63 58 42 42 000 Gene Apr-02 39 59 39 45	AVG 2002 50 50 10 33 67 67 67 50 33 75 63 58 42 42 eral Exal AVG 2002 39 59 39 45	Apr-01 20 67 60 17 33 67 25 33 50 50 100 67 100 67 mination Apr-01 57 63 40 27	AVG 2001 200 67 60 17 33 67 25 33 50 50 50 100 67 67 2001 57 63 40 227	Oct-00 33 67 40 67 56 78 50 67 33 17 72 33 Oct-00 44 36 40 32	20 67 0 17 33 100 50 33 25 75 83 50 0 0ct-00 43 56 34 37	2000 29.8 67.0 30.0 54.5 50.3 83.5 50.0 58.5 31.0 31.5 74.8 37.3 37.3 AVG 2000 43.5 46.0 37.0 34.5	35 58 45 21 58 75 63 75 63 75 40 44 44 79 46 0ct-99 40 56 45 29	1999 35 58 45 21 58 75 63 75 63 75 40 44 47 9 46 45 1999 40 56 45 29	40 33 20 50 0 100 25 0 42 25 50 33 33 Apr-98 54 65 25 41	1998 40 33 20 50 0 0 0 25 50 33 25 50 33 33 AVG 1998 54 65 54 65 25 24
CHEMISTRY COMPUTERS DYNAMICS LECTRICAL CIR. INGINEERING ECO. ITHICS LUID MECHANICS IAT SCI/ STR MAT. IATHEMATICS IAECH OF MATL. ITATICS HERMODYNAMICS SUBJECT CHEMISTRY COMPUTERS DYNAMICS LECTRICAL CIR. INGINEERING ECO.		Apr-03 50 50 30 8 50 67 46 63 42 33 National Apr-03 50 76 37 37 54	AVG 2003 50 50 30 8 50 67 46 63 42 33 42 33 9 1 Grades AVG 2003 50 76 37 37 54		Apr-02 50 50 10 33 67 67 50 33 75 63 58 42 42 Apr-02 89 59 39 45 50	AVG 2002 50 10 33 67 67 50 33 75 63 58 42 42 eral Exal AVG 2002 39 59 39 9 45 50	Apr-01 20 67 60 17 33 67 25 33 50 50 100 67 100 67 mination Apr-01 57 63 40 27 39	AVG 2001 200 67 60 17 33 67 25 33 50 50 100 67 67 400 67 801 57 63 40 2001 57 63 40 27 39	Oct-00 33 67 40 67 56 78 50 67 33 17 72 33 0 0 0 0 0 0 0 0 0 0 0 0 0	20 67 0 17 33 100 50 33 25 75 83 50 0 0 ct-00 43 56 34 37 38	2000 29.8 67.0 30.0 54.5 50.3 83.5 50.0 58.5 31.0 31.5 74.8 37.3 74.8 37.3 AVG 2000 43.5 46.0 37.0 34.5 39.0	35 58 45 21 58 75 63 75 63 75 63 75 40 44 79 46 0 0ct-99 40 56 56 45 29 41	1999 35 58 45 21 58 75 63 75 63 75 40 44 47 9 46 1999 40 56 45 29 41	40 33 20 50 0 100 25 0 42 25 50 33 33 Apr-98 54 65 25 41 38	1998 40 33 20 50 0 100 25 50 33 33 42 25 50 33 33 42 25 50 33 33 42 25 50 33 33 42 25 50 33 33
CHEMISTRY COMPUTERS DYNAMICS LECTRICAL CIR. INGINEERING ECO. THICS LUID MECHANICS MAT SCI/ STR MAT. MATHEMATICS MECH OF MATL. STATICS HERMODYNAMICS UBJECT CHEMISTRY COMPUTERS DYNAMICS LECTRICAL CIR. INGINEERING ECO. THICS		Apr-03 50 50 30 8 50 67 46 63 42 33 42 33 Nationa Apr-03 50 76 37 54 65	AVG 2003 50 50 30 8 50 67 46 63 42 33 42 33 42 33 50 76 37 54 65		Apr-02 50 50 10 33 67 67 67 50 33 75 63 58 42 42 0000 Gene 39 59 39 59 39 59 39 59 59 39 59 59 39 59 59 50 66	AVG 2002 50 10 33 67 67 67 63 33 75 63 58 42 9 75 63 58 42 9 75 63 58 42 9 75 63 58 42 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Apr-01 20 67 60 17 33 67 25 33 50 50 100 67 100 67 Mination Apr-01 57 63 40 27 39 74	AVG 2001 200 67 60 17 33 67 25 33 50 50 100 67 67 67 67 63 400 2001 57 63 40 227 39 74	Oct-00 33 67 40 67 56 78 50 67 33 17 72 33 17 72 33 0 0 0 0 0 0 44 36 40 32 40 82	20 67 0 17 33 100 50 33 25 75 83 50 0 0 ct-00 43 56 34 37 38 77	2000 29.8 67.0 30.0 54.5 50.3 83.5 50.0 58.5 31.0 31.5 74.8 37.3 37.3 37.3 AVG 2000 43.5 46.0 37.0 34.5 39.0 79.5	35 58 45 21 58 75 63 75 63 75 63 75 40 44 79 46 0ct-99 40 56 45 29 41 70	1999 35 58 45 21 58 75 63 75 63 75 63 75 63 75 40 44 44 79 46 8 8 8 999 40 56 45 29 41 70	40 33 20 50 0 100 25 0 42 25 50 33 33 Apr-98 54 65 25 41 38 88	1998 40 33 20 50 0 100 25 50 33 33 42 25 50 33 33 33 54 65 54 88 88
HEMISTRY COMPUTERS COMPUTE		Apr-03 50 50 30 8 50 67 46 63 42 33 33 Nationa Apr-03 50 76 37 54 65 42	AVG 2003 50 50 30 8 50 67 46 63 42 33 33 I Grades AVG 2003 50 76 37 37 54 65 42		Apr-02 50 50 10 33 67 50 33 75 63 58 42 Apr-02 39 59 39 45 50 66 54	AVG 2002 50 10 33 67 67 50 33 75 63 58 42 42 eral Exal AVG 2002 39 59 39 45 50 66 50	Apr-01 20 67 60 17 33 67 25 33 50 50 100 67 50 67 50 100 67 57 63 40 27 39 74 34	AVG 2001 20 67 60 17 25 33 67 25 33 50 50 100 67 67 67 8 2001 57 63 40 27 9 74 39 74	Oct-00 33 67 40 67 56 78 50 67 33 17 72 33 0 Oct-00 44 36 40 32 40 82 40 40 82 40 82 40 82 40 83 82 40 82 40 82 40 83 82 40 82 8 8 8 8 8 8 8 8	20 67 0 17 33 100 50 33 25 75 83 50 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2000 29.8 67.0 30.0 54.5 50.3 83.5 50.0 58.5 31.0 31.5 74.8 37.3 74.8 37.3 74.8 37.3 74.8 37.3 37.3 2000 43.5 46.0 37.0 34.5 39.0 79.5 35.5	35 58 45 21 58 75 63 75 63 75 63 75 40 44 47 9 46 0 0 ct-99 40 56 45 29 41 70 58	1999 35 58 45 21 58 75 63 75 63 75 63 75 40 44 44 79 46 1999 40 56 45 29 40 56 45 29 41 70 58	40 33 20 50 0 100 25 0 42 25 50 33 33 Apr-98 54 65 25 41 38 88 88 56	1998 40 333 20 50 0 100 25 50 333 25 50 333 25 50 333 25 54 65 255 41 38 88 88 88
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CHEMISTRY COMPUTERS COMPUT		Apr-03 50 50 30 8 50 67 46 63 42 33 Nationa Apr-03 50 76 37 54 65 42 62 47	AVG 2003 50 50 30 8 50 67 46 63 42 33 33 I Grades AVG 2003 50 76 37 37 54 65 42 2003		Apr-02 50 50 10 33 67 67 50 33 75 63 58 42 Apr-02 39 59 39 45 50 66 54 49 62	AVG 2002 50 10 33 67 67 67 67 63 33 76 63 33 76 63 58 42 9 78 8 76 63 9 9 39 42 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Apr-01 20 67 60 17 33 67 25 33 50 50 100 67 100 67 100 67 100 67 100 67 100 67 100 7 63 40 27 39 74 36 52	AVG 2001 200 67 60 17 33 67 25 33 50 50 100 67 67 67 8 40 2001 57 63 40 27 39 74 36 52	Oct-00 33 67 40 67 56 78 50 67 33 17 72 33 Oct-00 44 36 40 32 40 82 40 30 42 42	20 67 0 17 33 100 50 33 25 75 83 50 50 0 ct-00 43 56 34 37 38 77 31 61 49	2000 29.8 67.0 30.0 54.5 50.3 83.5 50.0 58.5 31.0 31.5 74.8 37.3 37.3 37.3 37.3 37.3 37.3 37.3 37	35 58 45 21 58 75 63 75 63 75 40 40 44 47 9 46 0ct-99 40 56 45 29 41 70 58 53 54	1999 35 58 45 21 58 75 63 75 63 75 40 44 40 44 79 46 45 29 40 56 45 29 41 70 58 53 54	40 33 20 50 0 100 25 0 42 25 50 33 33 33 Apr-98 54 65 25 41 38 88 85 43 55 43 51	1998 40 33 20 50 0 100 25 50 25 50 25 50 33 33 33 42 25 50 33 33 33 42 25 50 50 98 42 25 50 33 33 51
CHEMISTRY COMPUTERS DYNAMICS LECTRICAL CIR. INGINEERING ECO. THICS ILUID MECHANICS MAT SCI/STR MAT. MATHEMATICS MECH OF MATL. STATICS HERMODYNAMICS ILECTRICAL CIR. INGINEERING ECO. THICS ILUID MECHANICS MAT SCI/STR MAT. MATHEMATICS MECH OF MATL.		Apr-03 50 50 30 8 50 67 46 63 42 33 National Apr-03 50 76 37 54 65 42 62 47 25	AVG 2003 50 50 30 8 50 67 46 63 42 33 67 46 63 42 33 50 67 46 63 42 33 50 76 37 54 65 42 2003 50 76 67 46 63 42 2003 50 67 46 63 42 2003 50 67 46 63 42 2003 50 67 46 63 42 2003 50 67 46 63 42 2003 50 67 46 63 42 2003 50 67 46 63 42 2003 50 67 46 63 42 2003 50 67 46 63 42 2003 50 67 46 63 42 2003 50 67 46 63 42 2003 50 67 67 50 67 46 63 50 67 50 67 46 63 50 67 50 67 46 63 50 67 50 67 50 50 67 46 50 50 50 67 46 50 50 50 50 50 50 50 50 50 50		Apr-02 50 50 10 33 67 67 50 33 75 63 58 42 Apr-02 39 59 39 45 50 66 54 49 62 52	AVG 2002 50 10 33 67 67 67 50 53 33 75 63 58 42 2002 39 59 59 59 59 59 59 59 66 50 66 50 66 50 62 52	Apr-01 20 67 60 17 33 67 25 33 50 50 100 67 100 67 100 67 100 67 100 67 100 67 100 67 100 67 100 67 100 107 100 107 100 107 100 100	AVG 2001 200 67 60 17 33 67 25 33 50 50 100 67 100 67 2001 57 63 40 27 39 74 36 52 49	Oct-00 33 67 40 67 56 78 50 67 33 17 72 33 Oct-00 44 36 40 32 40 82 84 84 84 85 85 85 85 85	20 67 0 17 33 25 75 83 50 25 75 83 50 0 0 ct-00 43 56 34 37 38 77 38 77 31 61 49 48	2000 29.8 67.0 30.0 54.5 50.3 83.5 50.0 58.6 31.0 31.5 74.8 37.3 74.8 37.3 74.8 37.3 74.8 37.3 74.8 37.3 74.8 37.3 74.8 37.3 74.5 55 45.5 39.0 79.5 35.5 45.5 41.0	35 58 45 21 58 75 63 75 63 75 63 75 40 44 47 9 46 0 0ct-99 40 56 45 29 41 70 58 53 54 42	1999 35 58 45 21 58 75 63 75 63 75 63 75 40 44 44 79 46 845 29 40 56 45 29 41 70 58 53 54 42	40 33 20 50 0 100 25 50 0 42 25 50 33 33 Apr-98 54 65 25 41 38 88 56 43 51 34	1998 40 333 200 0 0 100 25 50 333 25 50 333 25 50 333 25 54 42 25 50 333 20 25 54 41 38 888 888 856 51 33
CHEMISTRY COMPUTERS DYNAMICS ELECTRICAL CIR. INGINEERING ECO. THICS FLUID MECHANICS MAT SCI/ STR MAT. MATHEMATICS MECH OF MATL. STATICS THERMODYNAMICS		Apr-03 50 50 30 8 50 67 46 63 42 33 Nationa Apr-03 50 76 37 54 65 42 62 47	AVG 2003 50 50 30 8 50 67 46 63 42 33 33 I Grades AVG 2003 50 76 37 37 54 65 42 2003		Apr-02 50 50 10 33 67 67 50 33 75 63 58 42 Apr-02 39 59 39 45 50 66 54 49 62	AVG 2002 50 10 33 67 67 67 67 63 33 76 63 33 76 63 58 42 9 78 8 76 63 9 9 39 42 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Apr-01 20 67 60 17 33 67 25 33 50 50 100 67 100 67 100 67 100 67 100 67 100 67 100 7 63 40 27 39 74 36 52	AVG 2001 200 67 60 17 33 67 25 33 50 50 100 67 67 67 8 40 2001 57 63 40 27 39 74 36 52	Oct-00 33 67 40 67 56 78 50 67 33 17 72 33 Oct-00 44 36 40 32 40 82 40 30 42 42	20 67 0 17 33 100 50 33 25 75 83 50 50 0 ct-00 43 56 34 37 38 77 31 61 49	2000 29.8 67.0 30.0 54.5 50.3 83.5 50.0 58.5 31.0 31.5 74.8 37.3 37.3 37.3 37.3 37.3 37.3 37.3 37	35 58 45 21 58 75 63 75 63 75 40 40 44 47 9 46 0ct-99 40 56 45 29 41 70 58 53 54	1999 35 58 45 21 58 75 63 75 63 75 40 44 40 44 79 46 45 29 40 56 45 29 41 70 58 53 54	40 33 20 50 0 100 25 0 42 25 50 33 33 33 Apr-98 54 65 25 41 38 88 85 43 51	1998 40 333 20 50 0 100 25 50 42 25 50 42 25 50 33 33 33 42 25 50 98 45 54 65 54 41 38 88 8 8 85 66 53

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CHEMISTRY 82.0 57.7 73 70.9 49.8 59 79 57 COMPUTERS 47.7 57.0 100 68.2 39.5 79 57 58.4 DTNAMCS 53.3 63.3 58 48.1 56.3 42 42 45.4 ENCINEERING ECO 33.3 73.3 80 62.2 85.0 70 80 78.5 ENINEERING ECO 33.3 73.3 80 73.3 59.8 85 100 81.4 MAT SCUSTR MAT. 50.3 75.7 74.7 48.8 69.0 72 75 75.0 68.7 MAT SCUSTR MAT. 53.3 75 76.8 75 74.3 75 76.3 75 76.3 75 76.3 75 76.3 75 76.3 75 76.4 75 75 76.4 75 75 76.4 75 75 76.4 75 75 75.4 75 74.4 75		Table 5.	Lamar C	ivil Eng	ineering	Grades	Three Y	ear Aver	age): M	orning S	essio
DHEMISTRY 82.0 67.7 73 70.9 49.8 69 46 61.3 COMPUTERS 47.7 57.0 100 68.2 60.8 61 33 61.4 ELECTRICAL CIR. 50.0 36.3 58 48.1 56.8 42 42.4 45.1 INGINEERING ECO. 33.3 73.3 80 62.2 85.0 70 80 73.3 ATHEM MAT. 50.3 21.0 75 44.8 69.0 72 75 74.4 ATHEMATICS 76.3 73.7 75 66.7 59.8 50.0 75 61.4 ATTICS 53.3 75.0 58 62.8 62.8 65.3 75 14.5 SUBJECT 2003 2002 2001 AVG 2000 1999 98.8 AVG OMPUTERS 55.0 62 43.1 59.5 50 44.5 51.4 DIMEUTERS 55.0 62 74.83.7 <th>SUBJECT</th> <th>2003</th> <th>2002</th> <th>2001</th> <th>AVG</th> <th></th> <th>2000</th> <th>1999</th> <th>1998</th> <th>AVG</th> <th></th>	SUBJECT	2003	2002	2001	AVG		2000	1999	1998	AVG	
COMPUTERS 47.7 57.0 100 68.2 39.5 79 57.6 68.4 VIAMICS 63.3 63.3 63.8 58 48.1 56.3 42 42 45.6 NGNEERING CO. 33.3 73.3 80 62.2 85.0 70 80.7 53.3 80 67.2 47.3 66.6 75.6 42.4 42 46.5 NOMEERING CO. 33.3 73.3 80 67.5 67.2 47.3 66.7 59.8 50.7 75.7 61.4 MATECHO MATL 58.3 66.7 75.8 66.7 59.8 50.7 75.4 61.4 FECHODYNAMICS 49.3 45.0 36.4 43.1 59.5 50.45 61.4 VILIDERCS 63.5 71.6 63.6 43.1 59.5 50.45 61.4 199.9 199.4 AVC VILIDIDECHANICS 61.0 65.6 64.7 20.0 199.9 199.4 AVC <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1998-2000</td><td></td></t<>										1998-2000	
SYMAMICS 63.3 68.3 78 68.2 60.8 61 33 61.4 LECTRICAL CIR. 50.0 36.3 78 80 73.3 80 73.3 80 73.3 80.7 70 80 73.3 THICS 86.7 53.3 80 73.3 69.8 85 100 81.1 TUID MCCHANICS 54.7 54.0 75 64.2 47.3 66 75 62.4 AATHEMATICS 76.3 73.7 58 69.3 57.0 67 59.8 50.7 75 64.3 BCCH OF MATL 58.3 65.0 58 62.8 62.8 65.0 51.4 51.4 MATHEMANICS 48.3 45.0 36 43.4 51.4 54.4 54.4 54.4 54.4 54.4 54.4 54.4 54.4 54.4 54.4 54.4 54.4 54.4 54.4 54.4 54.4 54.4 54.4 55.5 54.4										51.3	
ELECTRICAL CIR. 50.0 36.3 58 48.1 56.3 42 42 46.6 ENGINEERNO ECO. 33.3 73.3 80 62.2 85.0 70.0 80.7 53.3 80.0 62.2 85.0 70.0 80.7 63.3 73.3 59.8 85.0 70.0 81.7 72.1 75.7 72.4 74.7 74.6 75.0 68.7 73.0 67.7 72.6 75.0 68.7 75.0 68.7 75.0 68.7 75.0 68.7 75.0 68.7 75.0 68.7 75.0 68.7 75.1 75.0 68.7 75.1 74.1 74.7	OMPUTERS		57.0	100	68.2				57	58.5	
NGNEERING ECO. 33.3 73.3 80 62.2 85.0 70 80 73.3 TUID MECHANICS 54.7 54.0 75 61.2 47.3 66 75 62.4 MAT SCU'STR MAT. 50.3 21.0 75 64.8 69.0 72 75 72.2 MATLEMATICS 76.3 73.7 58 66.7 59.8 50.7 56.1 MATLEMATICS 55.3 75.0 58 62.8 62.8 62.8 55.0 45.5 51.4 PIERMODYNAMICS 48.3 46.0 36 43.1 59.5 50 45 54.4 CHEMISTRY 63.5 61 64 62.8 63.0 56 54 64.2 ONLARCS 76 63.6 64 80 70.8 77 61 55 54.4 CHEMISTRY 63.5 61.0 65 64.7 57.0 65.7 65.5 54.4 41.5 15 58 <td>YNAMICS</td> <td>63.3</td> <td>63.3</td> <td>78</td> <td>68.2</td> <td></td> <td>60.8</td> <td>61</td> <td>33</td> <td>51.6</td> <td></td>	YNAMICS	63.3	63.3	78	68.2		60.8	61	33	51.6	
THICS 86.7 53.3 80 73.3 59.8 85 100 91.1 UID MECHANICS 54.7 54.0 75 44.8 69.0 72 75 72.7 MAT-BCMTOS 76.3 73.7 58 69.3 67.0 67.0 57 64.8 MAT-BCMTOS 55.3 76.0 58 62.8 62.8 62.8 62.8 65.0 45.5 61.1 TABLE 6. National Grades (Three Year Average): Morning Session 1999 1998 AVG 2000 1999 1998 AVG COMPUTERS 55.0 62 74 63.7 49.5 61.5 58 54.4 COMPUTERS 55.0 62 74 63.7 64.9 50.8 55 64.2 COMPUTERS 53.0 55 67 55.8 64.7 57.0 57 64.5 64.7 57.0 57 64.5 64.7 57.6 64.5 64.7 57.6 64.5 64.7 <td>LECTRICAL CIR.</td> <td>50.0</td> <td>36.3</td> <td>58</td> <td>48.1</td> <td></td> <td>56.3</td> <td>42</td> <td>42</td> <td>46.8</td> <td></td>	LECTRICAL CIR.	50.0	36.3	58	48.1		56.3	42	42	46.8	
LUD MECHANICS 54.0 75 61.2 47.3 66 75 62.2 WAT-BEURAT. 50.3 21.0 75 48.9 69.0 72 75 72.2 WAT-BEURAT. 58.3 66.7 75 68.7 59.8 50.0 75 61.1 STATCS 58.3 75.0 58.6 62.8 62.8 65.7 74.1 FILERMODYNAMICS 48.3 45.0 36 43.1 59.5 50 45.5 51.4 Table 6. National Grades (Three Year Average): Morning Session 1999 1998 AVC 200.0 1999 1998 AVC CHEMISTRY 63.5 61 64 62.8 53.0 55 54.4 43.2 COMPLTERS 55.0 62 74 63.7 49.5 61 55.5 54.5 COMPLTERS 55.0 62.7 45.7 57.0 57 76.5 55.5 54.5 54.5 54.5 54.5 54.5	NGINEERING ECO.	33.3	73.3	80	62.2		85.0	70	80	78.3	
MAT SCU'STR MAT. 50.3 21.0 75 48.8 69.0 72 75 72.7 MATHEMATICS 76.3 77.5 78 69.3 57.0 67 50 68.7 STATICS 55.3 75.0 58 62.8 85 75 74.1 TAICS 53.3 75.0 58 62.8 86.7 57 74.1 Table 6. National Grades (Three Year Average): Morning Session 14.99 19.98 AVC SUBJECT 2003 2002 2001 AVG 2000 19.99 19.98 AVC COMPUTERS 55.0 62 74 63.7 49.5 61 54.5 COMPUTERS 55.0 62 74 63.7 57.0 57 64.5 SUBJECT 68.5 64.4 80.70.8 73.5 80.80 77.5 56.5 64.4 57.0 57 62.5 56.5 64.7 57.0 57.7 62.5 56.5 64.7	THICS	86.7	53.3	80	73.3	e a	59.8	85	100	81.6	
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MATHEMATICS 76.3 73.7 58 69.3 57.0 67 50 69.8 MCCH OF MATL. 58.3 66.7 75 66.7 59.8 50 75 74.1 STATICS 55.3 75.0 58 62.8 62.8 62.8 65.7 74.3 FHERMODYNAMICS 48.3 45.0 36 43.1 59.5 50 45.5 61.4 Table 6. National Grades (Three Year Average): Morning Session 1999 1998 AVG SUBJECT 2003 2002 2001 AVG 2000 1999 1998 AVG SUBJECT 63.5 61 64 62.8 53.0 55 54.4 COMPLTERS 55.0 62 74 63.7 77.5 76.1 55.5 VNAMICS 61.0 68 64.7 57.0 57.7 61.6 63.7 67.0 57.7 62.5 64.4 50.5 56.5 64.7 57.0 57.7 <td< td=""><td></td><td></td><td>the second s</td><td></td><td>Contraction of the local division of the loc</td><td>2 S</td><td></td><td></td><td></td><td>72.0</td><td></td></td<>			the second s		Contraction of the local division of the loc	2 S				72.0	
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Table 6. National Grades (Three Year Average): Morning Session SUBJECT 2003 2002 2001 AVG 2000 1999 1998 AVG CHEMISTRY 63.5 61 64 62.8 53.0 56 54 54.3 COMPUTERS 55.0 62 74 63.7 49.6 61 57 56.3 SUBJECT 203.5 60 64.6 62.2 39.0 41 45 41.3 INGINEERING ECO. 61.0 68 65 64.7 57.0 57 61 56.3 LUID MECHANICS 63.0 55.5 67 56.3 50.5 55 55 51 55 55 55 51 55						8 8					
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DELEMISTRY 63.5 61 64 62.8 53.0 56 54 COMPUTERS 55.0 62 74 63.7 49.5 61 57 56.0 COMPUTERS 55.0 62 74 63.7 49.5 61 57 56.0 CUMPUTERS 61.0 56 64.7 57.0 57 61 68.1 LECTRICAL CIR. 39.5 40 56 64.7 57.0 57 61 68.2 THICS 68.5 64.8 80 70.8 73.5 80 80 77.4 CUID MECHANICS 53.0 55 67 63.3 50.5 57 64 60.2 45.0 65 64. AATHEMATICS 64.4 52.4 49.0 71 59 57 64 66.2 49.0 71 59 TATICS 55.5 64 49 66.2 49.0 71 59 57 TATICS </td <td></td> <td>Table 6.</td> <td>Nationa</td> <td>l Grades</td> <td>(Three \</td> <td>′ear Ave</td> <td>rage): M</td> <td>orning S</td> <td>ession</td> <td></td> <td></td>		Table 6.	Nationa	l Grades	(Three \	′ear Ave	rage): M	orning S	ession		
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STATICS 42 58 100 66.7 74.8 79 50 67.3 THERMODYNAMICS 33 42 67 47.3 37.3 46 33 38.8 Table 8. National Grades (Three year Average): Afternoon Session 1999 1998 Avc SUBJECT 2003 2002 2001 AvG 2000 1999 1998 Avc CHEMISTRY 50 39 57 48.7 43.5 40 54 45.8 COMPUTERS 76 59 63 66.0 46.0 56 65 55.7 DYNAMICS 37 39 40 38.7 37.0 45 25 35.7 CLECTRICAL CR. 37 45 27 36.3 34.5 29 41 34.8 ENGINEERING ECO. 54 50 39 47.7 39.0 41 38 39.5 THICS 65 66 74 68.3 79.5						1				37.7	
Table 8. National Grades (Three year Average): Afternoon Session SUBJECT 2003 2002 2001 AVG 2000 1999 1998 AVG SUBJECT 2003 2002 2001 AVG 2000 1999 1998 AVG CHEMISTRY 50 39 57 48.7 43.5 40 54 455. COMPUTERS 76 59 63 66.0 46.0 56 65 55. DYNAMICS 37 39 40 38.7 37.0 45 25 35.7 CHECRICAL CIR. 37 45 27 36.3 34.5 29 41 34.8 ENGINEERING ECO. 54 50 39 47.7 39.0 41 38 39.5 THICS 65 66 74 68.3 79.5 70 88 79.5 CUID MECHANICS 42 54 34 43.3 35.5 58 56 49.0	ECH OF MATL.	63	63		58.7		31.5		25	33.5	
Table 8. National Grades (Three year Average): Afternoon Session SUBJECT 2003 2002 2001 AVG 2000 1999 1998 AVG SUBJECT 2003 2002 2001 AVG 2000 1999 1998 AVG CHEMISTRY 50 39 57 48.7 43.5 40 54 455. COMPUTERS 76 59 63 66.0 46.0 56 65 55.5 DYNAMICS 37 39 40 38.7 37.0 45 25 35.7 ELECTRICAL CIR. 37 45 27 36.3 34.5 29 41 34.8 ENGINEERING ECO. 54 50 39 47.7 39.0 41 38 39.2 FUID MECHANICS 42 54 34 43.3 35.5 58 56 49.3 GUID MECHANICS 42 54 34 43.3 35.5 54 51 60.4	TATICS	42	58	100	66.7		74.8	79	50	67.9	
SUBJECT 2003 2002 2001 AVG 2000 1999 1998 AVG 2001-2003 - - - 2001-2003 - 1998-2 1998-2 CHEMISTRY 50 39 57 48.7 - 43.5 40 54 45.8 COMPUTERS 76 59 63 66.0 46.0 56 65 55.7 DYNAMICS 37 39 40 38.7 37.0 45 25 35.7 ELECTRICAL CIR. 37 45 27 36.3 34.5 29 41 34.8 NGINEERING ECO. 54 50 39 47.7 39.0 41 38 39.2 THICS 65 66 74 68.3 79.5 70 88 79.2 FLUID MECHANICS 42 54 34 43.3 35.5 58 56 49.8 MAT SCI/ STR MAT. 62 49 36 <					47.3		37.3			38.8	
SUBJECT 2003 2002 2001 AVG 2000 1999 1998 AVG 2001-2003 - - - 2001-2003 - 1998-2 1998-2 CHEMISTRY 50 39 57 48.7 - 43.5 40 54 45.8 COMPUTERS 76 59 63 66.0 46.0 56 65 55.7 DYNAMICS 37 39 40 38.7 37.0 45 25 35.7 ELECTRICAL CIR. 37 45 27 36.3 34.5 29 41 34.8 NGINEERING ECO. 54 50 39 47.7 39.0 41 38 39.5 THICS 65 66 74 68.3 79.5 70 88 79.2 LUID MECHANICS 42 54 34 43.3 35.5 58 56 49.8 MAT SCI/ STR MAT. 62 49 36 <t< td=""><td></td><td>Table 8</td><td>Nationa</td><td>Grades</td><td>(Three \</td><td>ear Ave</td><td>rage): Aff</td><td>ernoon</td><td>Session</td><td></td><td></td></t<>		Table 8	Nationa	Grades	(Three \	ear Ave	rage): Aff	ernoon	Session		
2001-2003 1998-2 CHEMISTRY 50 39 57 48.7 43.5 40 54 45.8 COMPUTERS 76 59 63 66.0 46.0 56 65 55.7 DYNAMICS 37 39 40 38.7 37.0 45 25 35.7 ELECTRICAL CIR. 37 45 27 36.3 34.5 29 41 34.8 ENGINEERING ECO. 54 50 39 47.7 39.0 41 38 39.3 ETHICS 65 66 74 68.3 79.5 70 88 79.4 LUID MECHANICS 42 54 34 43.3 35.5 58 56 49.8 MAT SCI/STR MAT. 62 49 36 49.0 45.5 53 43 47.4 MATHEMATICS 47 62 52 53.7 45.5 54 51 50.4 51 50.4 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>AVG</td><td></td></td<>										AVG	
COMPUTERS 76 59 63 66.0 46.0 56 65 55.1 DYNAMICS 37 39 40 38.7 37.0 45 25 35.1 ELECTRICAL CIR. 37 45 27 36.3 34.5 29 41 34.8 INGINEERING ECO. 54 50 39 47.7 39.0 41 38 39.2 ETHICS 65 66 74 68.3 79.5 70 88 79.2 FLUID MECHANICS 42 54 34 43.3 35.5 58 56 49.8 MAT SCI/STR MAT. 62 49 36 49.0 45.5 53 43 47.4 MATHEMATICS 47 62 52 53.7 45.5 54 51 60.2 WECH OF MATL. 25 52 49 42.0 41.0 42 34 39.0 STATICS 51 64 41 52					2001-2003					1998-2000	
COMPUTERS 76 59 63 66.0 46.0 56 65 55.1 DYNAMICS 37 39 40 38.7 37.0 45 25 35.1 ELECTRICAL CIR. 37 45 27 36.3 34.5 29 41 34.8 INGINEERING ECO. 54 50 39 47.7 39.0 41 38 39.2 ETHICS 65 66 74 68.3 79.5 70 88 79.2 FLUID MECHANICS 42 54 34 43.3 35.5 58 56 49.8 MAT SCI/STR MAT. 62 49 36 49.0 45.5 53 43 47.4 MATHEMATICS 47 62 52 53.7 45.5 54 51 60.2 MATHEMATICS 47 62 52 49.20 41.0 42 34 39.0 MATHEMATICS 51 64 41 <td< td=""><td>HEMISTRY</td><td>50</td><td>39</td><td>57</td><td>48.7</td><td></td><td>43.5</td><td>40</td><td>54</td><td>45.8</td><td></td></td<>	HEMISTRY	50	39	57	48.7		43.5	40	54	45.8	
DYNAMICS 37 39 40 38.7 37.0 45 25 35.7 LECTRICAL CIR. 37 45 27 36.3 34.5 29 41 34.8 ENGINEERING ECO. 54 50 39 47.7 39.0 41 38 39.2 THICS 65 66 74 68.3 79.5 70 88 79.2 CLUID MECHANICS 42 54 34 43.3 35.5 58 56 49.8 MAT SCI/STR MAT. 62 49 36 49.0 45.5 53 43 47.4 MATHEMATICS 47 62 52 53.7 45.5 54 51 50.4 MECH OF MATL. 25 52 49 42.0 41.0 42 34 39.0 STATICS 51 64 41 52.0 57.5 53 61 57.2		76			66.0			56	65	55.7	
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MATHEMATICS 47 62 52 53.7 45.5 54 51 50.2 MECH OF MATL. 25 52 49 42.0 41.0 42 34 39.0 STATICS 51 64 41 52.0 57.5 53 61 57.2	AT SCI/ STR MAT.	62	49	36	49.0		45.5	53	43	47.2	
MECH OF MATL. 25 52 49 42.0 41.0 42 34 39.0 STATICS 51 64 41 52.0 57.5 53 61 57.2		47	62	52	53.7	2		54	51	50.2	
STATICS 51 64 41 52.0 57.5 53 61 57. 2						0				39.0	
	HERMODYNAMICS	40	45	45	43.3	8 8	30.0	35	37	34.0	
	IL RIVIOD TRAIVICS	40	40	40	40.0		50.0	55	51	54.0	

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	Table 9.	Three Ye	ear ratio	s: Morning Ex	amination			
SUBJECT	2003	2002	2001	AVG	2000	1999	1998	AVG
				2001-2003				1998-2000
CHEMISTRY	1.29	0.95	1.14	1.13	0.94	1.05	0.83	0.94
COMPUTERS	0.87	0.92	1.35	1.07	0.80	1.30	1.00	1.05
DYNAMICS	1.04	1.15	1.28	1.16	1.18	1.05	0.60	0.94
ELECTRICAL CIR.	1.27	0.91	1.04	1.07	1.44	1.02	0.93	1.12
ENGINEERING ECO.	0.55	1.08	1.23	0.96	1.49	1.23	1.31	1.34
ETHICS	1.27	0.83	1.00	1.04	0.81	1.06	1.25	1.05
FLUID MECHANICS	1.03	0.98	1.12	1.05	0.94	1.16	1.21	1.11
MAT SCI/ STR MAT.	0.94	0.44	1.27	0.91	1.41	1.20	1.39	1.33
MATHEMATICS	1.19	1.23	1.02	1.15	1.07	1.12	0.78	0.98
MECH OF MATL.	0.98	1.17	1.17	1.11	1.33	0.91	1.36	1.19
STATICS	1.00	1.17	1.18	1.12	1.28	1.20	1.27	1.24
HERMODYNAMICS	1.09	1.01	0.69	0.92	1.43	1.11	0.90	1.13
	Table 10).Three \	∕ear Rat	ios: Afternoor	n General Ex	am		
SUBJECT	2003	2002	2001	AVG	2000	1999	1998	AVG
				2001-2003				1998-2000
DUITS MOTOW	1.00	1.28	0.35	0.82	0.00	0.88	0.74	0.76
					0.68			
COMPUTERS	0.66	0.85	1.06	0.84	1.46	1.04	0.51	0.95
COMPUTERS DYNAMICS	0.81	0.85 0.26	1.06 1.50	0.84 0.86	1.46 0.81	1.00	0.80	0.89
COMPUTERS DYNAMICS ELECTRICAL CIR.	0.81	0.85 0.26 0.73	1.06 1.50 0.63	0.84 0.86 0.53	1.46 0.81 1.58	1.00 0.72	0.80 1.22	0.89 1.20
COMPUTERS DYNAMICS ELECTRICAL CIR. ENGINEERING ECO.	0.81 0.22 0.93	0.85 0.26 0.73 1.34	1.06 1.50 0.63 0.85	0.84 0.86 0.53 1.05	1.46 0.81 1.58 1.29	1.00 0.72 1.41	0.80 1.22 0.00	0.89 1.20 0.92
COMPUTERS DYNAMICS ELECTRICAL CIR. ENGINEERING ECO. ETHICS	0.81 0.22 0.93 1.03	0.85 0.26 0.73 1.34 1.02	1.06 1.50 0.63 0.85 0.91	0.84 0.86 0.53 1.05 0.98	1.46 0.81 1.58 1.29 1.05	1.00 0.72 1.41 1.07	0.80 1.22 0.00 1.14	0.89 1.20 0.92 1.09
COMPUTERS DYNAMICS ELECTRICAL CIR. ENGINEERING ECO. ETHICS ELUID MECHANICS	0.81 0.22 0.93 1.03 1.19	0.85 0.26 0.73 1.34 1.02 0.93	1.06 1.50 0.63 0.85 0.91 0.74	0.84 0.86 0.53 1.05 0.98 0.96	1.46 0.81 1.58 1.29 1.05 1.41	1.00 0.72 1.41 1.07 1.09	0.80 1.22 0.00 1.14 0.45	0.89 1.20 0.92 1.09 0.92
COMPUTERS DYNAMICS ELECTRICAL CIR. ENGINEERING ECO. THICS TUID MECHANICS MAT SCI/ STR MAT.	0.81 0.22 0.93 1.03 1.19 1.08	0.85 0.26 0.73 1.34 1.02 0.93 0.67	1.06 1.50 0.63 0.85 0.91 0.74 0.92	0.84 0.86 0.53 1.05 0.98 0.96 0.90	1.46 0.81 1.58 1.29 1.05 1.41 1.29	1.00 0.72 1.41 1.07 1.09 1.42	0.80 1.22 0.00 1.14 0.45 0.00	0.89 1.20 0.92 1.09 0.92 0.94
COMPUTERS DYNAMICS ELECTRICAL CIR. ENGINEERING ECO. ETHICS FLUID MECHANICS MAT SCI/ STR MAT.	0.81 0.22 0.93 1.03 1.19 1.08 0.98	0.85 0.26 0.73 1.34 1.02 0.93 0.67 1.21	1.06 1.50 0.63 0.85 0.91 0.74	0.84 0.86 0.53 1.05 0.98 0.96	1.46 0.81 1.58 1.29 1.05 1.41 1.29 0.68	1.00 0.72 1.41 1.07 1.09	0.80 1.22 0.00 1.14 0.45	0.89 1.20 0.92 1.09 0.92
COMPUTERS DYNAMICS ELECTRICAL CIR. ENGINEERING ECO. ETHICS FLUID MECHANICS MAT SCI/ STR MAT. MATHEMATICS MECH OF MATL.	0.81 0.22 0.93 1.03 1.19 1.08 0.98 2.52	0.85 0.26 0.73 1.34 1.02 0.93 0.67 1.21 1.21	1.06 1.50 0.63 0.85 0.91 0.74 0.92 0.96 1.02	0.84 0.86 0.53 1.05 0.98 0.96 0.90 1.06 1.40	1.46 0.81 1.58 1.29 1.05 1.41 1.29 0.68 0.77	1.00 0.72 1.41 1.07 1.09 1.42 0.74 1.05	0.80 1.22 0.00 1.14 0.45 0.00 0.82 0.74	0.89 1.20 0.92 1.09 0.92 0.94 0.75 0.86
CHEMISTRY COMPUTERS DYNAMICS ELECTRICAL CIR. ENGINEERING ECO. ETHICS ELUID MECHANICS MAT SCI/ STR MAT. MATHEMATICS MECH OF MATL. STATICS THERMODYNAMICS	0.81 0.22 0.93 1.03 1.19 1.08 0.98	0.85 0.26 0.73 1.34 1.02 0.93 0.67 1.21	1.06 1.50 0.63 0.85 0.91 0.74 0.92 0.96	0.84 0.86 0.53 1.05 0.98 0.96 0.90 1.06	1.46 0.81 1.58 1.29 1.05 1.41 1.29 0.68	1.00 0.72 1.41 1.07 1.09 1.42 0.74	0.80 1.22 0.00 1.14 0.45 0.00 0.82	0.89 1.20 0.92 1.09 0.92 0.94 0.75

	Table 11. Six Year Ratios			
SUBJECT	MORNING	AFTERNOON		
CHEMISTRY	1.04	0.79		
COMPUTERS	1.06	0.89		
DYNAMICS	1.05	0.87		
ELECTRICAL CIR.	1.09	0.86		
ENGINEERING ECO.	1.14	0.99		
ETHICS	1.04	1.04		
FLUID MECHANICS	1.08	0.94		
MAT SCI/ STR MAT.	1.12	0.92		
MATHEMATICS	1.07	0.91		
MECH OF MATL.	1.15	1.14		
STATICS	1.18	1.23		
THERMODYNAMICS	1.02	1.11		