

Results of the Department of Industrial Technology at California State University, Fresno

On the  
Certified Technologist Exam  
(Certified Technology Manager Exam)

Administered by  
National Association of Industrial Technology  
(Association of Technology Management and Applied Engineering)

For the academic year 2008-2009

Under a grant from the California State University, Fresno Institutional Research Planning and  
Assessment office

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*\*During the time of this study, NAIT changed its name to Association of Technology Management and Applied Engineering (ATMAE) and the name of the exam was changed from the CTE to the Certified Technology Manager Exam (CTME).*

## **Background**

Up until 2000, the Department of Industrial Technology was accredited by the National Association of Industrial Technology (NAIT\*). The department did not seek re-accreditation after that time because of staffing issues. As the department has re-staffed and is reassessing its mission, it seemed appropriate to see how the department compared to the national organization that it had been associated with. We decided to use the NAIT certification exam in two ways. One was to compare the emphasis of the exam to our current curriculum and to gauge how well our students did on the exam as compared to the national norm. A list of schools that participated in giving the national exam last academic year is shown in Table 1.

## **Process**

In Fall of 2008 and Spring of 2009, Industrial Technology students at CSU, Fresno enrolled in IT196 – Senior Seminar were offered the chance to take the NAIT (ATMAE) Certified Technologist Exam. IT196 is a capstone seminar class which is typically taken in a student's last semester. The students in this class are near completion of the program and their results on this exam should reflect the learning that has taken place in the program. The exam was administered on-line during on December 18, 2008 and May 11, 2009.

## **About the Exam**

Among the certification exams offered by NAIT (ATMAE) a general exam, Certified Technologist Exam (CTE\*) covers topics that have been identified by industrial councils as valuable for graduates in the Industrial Technology discipline. It has 160 multiple choice questions covering the topics noted below in Table 2. If a student scores above 75%, they are eligible to obtain a certificate indicating they are a Certified Technology Manager. There are some questions that are in the validation process on each administration of the exam and those questions are not included in the total.

A comparison of our curriculum to the exam emphasis shows that our program is mostly on aligned with this examination. The first nine categories are covered in the general education component of the university. Within the general education courses, Industrial Technology students are required to take Physics, Chemistry, Statistics and another math (or related) course. The only topic not covered directly through the general education courses is Business Law.

Of the remaining 13 topics, seven are directly covered in required courses in the major. The questions in these topics account for 69% of the questions in the major, which is 52% of questions in the entire exam. While core courses are not designed around the other six topics, most of these topics are covered within the course curriculum of required courses. In summary, if the department wanted to align closer to this national exam, topics of Business Law, Industrial Finance and Accounting and Industrial Supervision could be more directly addressed in the curriculum

## **Student Results**

The scores of the students tested at California State University, Fresno is shown in Figure 3. The category and number of questions in each are provided in the first rows. The student numbers indicate which semester the student took the exam; F for Fall and S for Spring.

Eleven of the twenty one students at Fresno State passed the exam for a pass rate at Fresno State of 52.4%. The national pass rate, as posted by NAIT, was 52.2%. The national average score was 62. The average score at Fresno State was 75.

In looking at the individual categories, the students at Fresno State scored as well, or perhaps better than the national average. All of the scores in the individual categories were within one standard deviation to the national average.

Note that one student started but only answered two questions before quitting. His results are included in the calculations. If the calculations are done with his sample deleted, there is a slight improvement in the aggregate scores, but it is not statistically significant. As his data is included in the national data, it was felt proper to include it in our analysis.

## **Summary**

The students at Fresno State are performing well as compared to students in similar programs. For the most part, the curriculum at Fresno State reflects the national standards.

As a result of the comparison of our curriculum to the national exam, we are in the process of making changes to our curriculum that will include enhancement of selected topics.

1. Alcorn	15. Millersville
2. Arkansas Northeastern College	16. Mississippi State
3. Bemidji State	17. Morehead State
4. California Poly St.	18. North Carolina A&T
5. California St. Univ.-Fresno	19. San Jose State
6. California Uni. of PA	20. Southeastern Louisiana
7. Central Conn. St.	21. Southern Illinois
8. Central Michigan	22. Southern Maine
9. Central Missouri	23. Southwestern Oklahoma St.
10. Eastern Illinois	24. St. Cloud State
11. Eastern Kentucky	25. Tennessee Tech
12. Industry	26. The University of Texas of the Permian Basin
13. Iowa State	27. The University of Texas at Tyler
14. Ivy Tech	28. Wayne State

**Table 1.** Organizations participating in the Certified Technology Manager Exam 2008-2009

Question Topic	No. of Questions
Algebra	3
Trigonometry	4
Statistics	12
Chemistry	4
Physics	3
English	3
Psychology	3
Sociology	1
Business Law	6
Facilities Layout & Materials Handling	3
Industrial Communication	2
Industrial Ergonomics	4
Industrial Finance & Accounting	3
Industrial Management	12
Industrial Safety Management	33
Industrial Supervision	9
Manufacturing Processes	1
Production Planning & Control	19
Project Management	3
Quality Control	23
Time & Motion Study	8
Total Quality Management	1

**Table 2.** Question topics on the NAIT Certified Technology Manager Exam

STUDENTS (F=Fall/S=Spring)	Algebra	Business Law	Chemistry	English	Facility Layout/Mat'l H'dling	Industrial Communication	Industrial Ergonomics	Industrial Finance / Accounting	Industrial Management	Industrial Safety Management	Industrial Supervision	Manufacturing Processes	Physics	Production Planning / Control	Project Management	Psychology	Quality Control	Sociology	Statistics	Time & Motion Study	Total Quality Management	Trigonometry	Score	Student Pass (cutoff score=75)
# of questions	3	6	4	3	3	2	4	3	12	33	9	1	3	19	3	3	23	1	12	8	1	4		
<b>F1</b>	2	2	3	2	3	1	3	3	9	25	8	1	1	16	0	1	13	0	5	5	1	1	<b>96</b>	<b>Y</b>
<b>F2</b>	1	4	2	1	3	2	3	2	5	19	7	1	2	16	2	2	12	0	6	5	1	3	<b>88</b>	<b>Y</b>
<b>F3</b>	1	2	2	3	3	1	4	1	4	21	6	1	3	15	2	1	13	0	7	3	0	2	<b>82</b>	<b>Y</b>
<b>F4</b>	1	4	2	1	3	2	4	1	8	21	6	1	2	13	1	2	4	0	5	7	1	3	<b>82</b>	<b>Y</b>
<b>F5</b>	1	4	1	2	2	2	3	1	7	19	7	1	1	14	1	2	7	0	7	5	0	2	<b>81</b>	<b>Y</b>
<b>F6</b>	3	5	2	1	2	1	3	2	8	16	4	1	2	11	3	0	8	0	9	7	1	2	<b>78</b>	<b>Y</b>
<b>F7</b>	1	4	2	2	2	2	3	1	7	19	5	1	0	9	1	1	9	0	4	5	1	1	73	<b>N</b>
<b>F8</b>	1	2	4	2	2	1	2	0	8	19	6	1	0	10	0	1	8	0	5	7	0	1	72	<b>N</b>
<b>F9</b>	1	6	2	2	1	1	4	2	5	13	6	1	1	11	1	1	8	0	8	2	0	1	69	<b>N</b>
<b>F10</b>	2	5	3	2	2	1	2	2	7	12	6	1	0	11	0	0	9	0	3	6	0	2	67	<b>N</b>
<b>F11</b>	2	1	2	2	2	1	4	1	6	11	5	0	2	8	1	1	9	1	5	4	1	3	60	<b>N</b>
<b>F12</b>	0	3	2	1	2	1	2	0	7	12	6	0	1	7	1	0	10	0	5	5	0	2	60	<b>N</b>
<b>F13</b>	1	3	2	1	2	0	3	1	3	11	3	1	0	8	0	2	6	0	2	3	0	1	48	<b>N</b>
<b>F14</b>	3	2	2	2	0	1	0	0	3	11	3	1	1	7	0	0	11	0	2	2	0	3	43	<b>N</b>
<b>S15</b>	3	4	2	2	3	0	3	1	6	23	9	1	1	14	2	2	10	1	7	7	1	0	<b>92</b>	<b>Y</b>
<b>S16</b>	2	5	2	3	2	1	3	2	10	20	8	1	2	13	1	2	12	0	7	3	1	2	<b>90</b>	<b>Y</b>
<b>S17</b>	2	4	3	2	3	2	4	2	8	21	8	1	0	14	2	2	6	0	7	5	1	1	<b>88</b>	<b>Y</b>
<b>S18</b>	3	4	4	3	2	1	3	3	9	19	7	0	2	10	2	0	12	0	7	8	1	3	<b>86</b>	<b>Y</b>
<b>S19</b>	1	3	2	3	2	2	3	1	8	23	5	1	0	8	1	1	8	0	6	7	1	2	<b>79</b>	<b>Y</b>
<b>S20</b>	1	3	3	2	1	1	3	1	10	17	8	1	2	12	3	1	9	0	4	5	0	2	<b>76</b>	<b>Y</b>
<b>S21</b>	3	5	1	2	1	1	3	1	5	11	4	1	1	7	1	2	10	0	3	4	0	1	58	<b>N</b>
<b>S22</b>	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	<b>N</b>
CSUF Avg	2	4	2	2	2	1	3	1	7	17	6	1	1	11	1	1	9	0	5	5	1	2	75	
CSUF StDv	0.90	1.47	0.91	0.77	0.90	0.64	0.99	0.88	2.48	5.67	2.09	0.39	0.92	3.79	0.94	0.81	3.06	0.29	2.22	2.02	0.51	0.94	21.27	
Nat'l Avg	1	3	2	2	2	1	2	1	6	15	5	1	1	9	1	1	8	0	4	4	0	1	62	
Nat'l StDv	1.00	1.84	1.09	1.02	1.04	0.78	1.42	1.07	3.38	8.29	2.68	0.47	0.90	5.16	0.96	0.99	4.93	0.36	2.86	2.49	0.50	1.11	33.64	

**Table 3.** Results of the students in the Department of Industrial Technology, California State University, Fresno

