

Student Performance in an Undergraduate Thermodynamics Course Offered at two Different Times of the Day

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Abstract

Two sections of the ME 4293-Thermodynamics-II has been offered in our mechanical engineering program. After teaching this course online during Covid-19 pandemic, two different instructors taught this course face-to-face, the first in spring 2022, and the second in fall 2022. In both semesters, the first sections of the course was scheduled at 8:30 am and the second one was offered at 11:30 am. The instructors compare student performance in the earlier section compared to the later sections. The presentation at annual meeting will summarize the possible causes for differences in student performances in the sections. The authors have been teaching undergraduate and graduate courses in thermal sciences for many years at UTSA. They have noticed a gradual change in student study habits such as reading the textbook, attending lectures, or completing assignments that affected student performance in their courses. These observations and attempts to address the adverse effects were reported in previous studies^{1,2,3,4,5,6}.

In spring of 2022, 32 students were enrolled in the first section of ME 4293 scheduled at 8:30 am and 58 students were in the second section at scheduled at 11:30 am. Three common midterm and one comprehensive final exams were given in this course. All common exams were given outside the scheduled lecture time for uniform assessment of exam performance by students enrolled in both sections. Table 1 provides a summary of exam performance by all students enrolled in ME 4293 during spring 2023.

Table 1. Exam performance by students enrolled in two sections of ME 4293 in spring 2022

Spring 22	Section	# of exams	< 60	60-69	70-79	80-89	> 90	Ave	Std-Dv
Exam 1	8:30am	30	37%	27%	10%	7%	20%	66.03	20.58
Exam 2	8:30am	30	27%	30%	10%	10%	23%	69.73	21.83
Exam 3	8:30am	27	15%	19%	26%	11%	30%	77.30	20.30
Final Ex	8:30am	26	48%	11%	7%	11%	19%	60.65	27.18
Exam 1	11:30am	56	34%	18%	16%	9%	23%	70.44	20.63
Exam 2	11:30am	55	25%	9%	24%	15%	27%	72.38	23.08
Exam 3	11:30am	48	13%	13%	11%	20%	31%	77.82	21.11
Final Ex	11:30am	46	33%	13%	11%	13%	15%	66.48	22.12

In fall 2022, 34 students were enrolled in the first section of ME 4293 scheduled at 8:30 am and 52 students in the course in the second section scheduled at 11:30 am. Three midterm and one comprehensive final exams were given in the course. In this semester, the exams were given during the regularly scheduled lecture time. The third midterm exam was given very close to the end of

semester. The final exam was optional, for those students who wished to increase their grade. The results of exam performances by all students enrolled in ME 4293 in fall 2022 are presented in Table 2.

Table 2. Exam performance by students enrolled in two sections of ME 4293 in fall 2022

Fall 22	Section	# of exams	< 60	60-69	70-79	80-89	> 90	Ave	Std-dev
Exam 1	01&02	80	10%	9%	28%	19%	35%	80.35	13.97
Exam 2	01&02	83	6%	10%	22%	28%	35%	81.96	14.00
Exam 3	01&02	81	26%	27%	11%	10%	26%	67.85	17.38
Final	01&02	43	26%	40%	19%	12%	5%	67.05	12.47

Table 3 presents the grade distribution for each sections of ME 4293 offered in spring and fall 2022.

Table 3. Grade distribution in ME 4293 for spring and fall 2022

Semester	Section	A	B	C	D	F	W	IN	A-C	DWF
Spring 22	8:30am	26%	13%	19%	13%	23%	6%	0	58%	42%
Spring 22	11:30am	32%	16%	18%	11%	13%	11%	0	66%	34%
Fall 22	8:30am	6%	12%	56%	6%	18%	0%	2%0	74%	24%
Fall 22	11:30am	29%	21%	44%	4%	2%	0%	0	94%	6%

The data in Tables 1 through 3 may suggest that that students enrolled in classes scheduled at a later time of the day perform better in the class. Other factors such as students GPA, the performance of students in the first course in thermodynamics, as well as the effect of students gaining knowledge in prerequisite courses completed on-line during covid-19 pandemic. Multiple factors have been considered, yet the time of day appears to be a dominant factor in student performance.

References

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