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# Report

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## East Los Angeles College FS and LS 2019 Test Prep Course Survey Results

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## Executive Summary

- 0.1. East Los Angeles College offered two half-day classes on Saturday, September 21, 2019 to help students prepare for state and federal exams required for land surveyor certification. The survey had responses from 18 students who had taken the morning course for the Fundamentals of Surveying (FS) exam. The survey obtained only four (4) responses from students who had taken the afternoon National Land Surveyor (PS) and California State Specific Land Surveyor (LS) Test Prep class. Due to a lack of attendance tracking in either course it is not possible to calculate response rates.
- 0.2. Both courses did well in reaching the intending NSF ATE grant targets of women (half of each class) and Hispanics (72% of the FS class and 100% of the PS/LS class).
- 0.3. The variance in the age group distribution of FS Test Prep class survey respondents was greater than that of PS/LS Test Prep class respondents, but not significantly so for the under age 30 and age 30 or over age groups. However, the women who took the FS Test Prep class were significantly less likely than the men to be under age 30. Since there were nearly equal proportions of men and women in that class, this suggests that with the help of the grant funding ELAC is successfully reaching young women in its attempts to increase the proportion of women in the Land Surveying profession.
- 0.4. That is, if the FS Test Prep class helps participants pass that exam in greater proportions than statewide or nationally. It will not be possible to measure that outcome until six months to a year or more from the September 21, 2019 class, when national results are released in 2020 for the July to December 2019 and January to June 2020, and then the July to December 2020 results are released in early 2021. Even then, using this outcome measure depends on ELAC setting up a system to keep in touch with FS Test Prep class participants and learn the results of their FS tests. The same is true of the PS/LS Test Prep class.
- 0.5. Students in both classes had high school diplomas or GEDs, and a majority in the FS Test Prep class has an Associate degree in a STEM field. However, only a third in the FS Test Prep class had a baccalaureate degree in a STEM field. Similar results held for the more advanced PS/LS Test Prep class. Land surveying as a field may be more attractive to those with less than a baccalaureate degree, and those with a baccalaureate in a STEM field. No licensed Civil Engineers took either class.
- 0.6. Both Test Prep classes were well-received, with good or very good ratings for the instructor and his instructional style. However, there were criticisms in both classes of lack of time. Analysis of quantitative and qualitative survey results support recommendations for a) at least a day long FS Test Prep class and b) consideration of a two-day (consecutive Saturdays?) PS/LS Test Prep class. Sections 5 and 6 show detailed findings for the FS Test Prep class, and 10 and 11 for the PS/LS Test Prep class.
- 0.7. While there was support for online versions of the classes, there was also opposition. If online versions are developed there is greater support for live webinar versions with students able to interact with the instructor rather than pre-recorded videos available anytime.

- 1.1. This evaluation report has been prepared by REAP Change Consultants for the East Los Angeles College (ELAC) A T E grant 1801188 “Filling Skills Gap Through the Geospatial Engineering and Technology Program.” The grant and its evaluation are funded by the National Science Foundation (NSF). The long-term goal of the grant is to increase the number of professional land surveyors, especially those who are women or Hispanics (Latinos/Latinas). After education and training in land surveying, passing the six hour long, 110 question Fundamentals of Surveying (FS) exam is the first step in the process of becoming a professional licensed land surveyor (<https://ncees.org/surveying/fs/>). A person who has met the education and training qualifications to take and then passed the FS exam is allowed to hold land surveyor in training positions and work under the supervision of a professional land surveyor. Online and downloadable resources to prepare for the FS exam are available from The National Council of Examiners for Engineering and Surveying (NCEES), the nonprofit organization that provides and scores the exam nationally. However national pass rates are low. For example, only 47% of first-time test takers and 30% for repeat test takers passed the FS exam between January and June 2019. In California, after meeting experience requirements, those who have passed the FS exam become eligible to take the national NCEES Professional Surveyor (PS) examination and after passing the PS exam, the state specific California Professional Land Survey (LS) examination. After passing both of these exams, verifying that they have met other requirements and paying a licensure fee, a person can be licensed in California as a Professional Land Surveyor.
- 1.2. Because of the low pass rates on the FS and other exams, ELAC used NSF grant funds to pay for offering two test preparatory courses, both of which were held on Saturday, September 21, 2019. The morning class provided FS test orientation, educational preparation and practice test taking. The afternoon class provided PS and LS orientation, educational preparation and practice students interested in taking those advanced tests. The roll was not taken and students didn’t sign on an attendance sheet in either class. Both classes were taught by Mr. Hernandez, a licensed Land Surveyor in California.
- 1.3. The courses were evaluated through the use of online Survey Monkey surveys. A single survey was used for both classes (see Appendix A). The survey has an initial question confirming that the students were taking the survey voluntarily, five additional questions (including three demographic questions) that students in both classes were asked to answer, and then a “branching” question that took respondents to questions specific to the course that they had taken. Responses were anonymous and respondents could leave the survey at any time.
- 1.4. The online survey was intended to be completed immediately following the course and the instructor was to announce it and provide a link to the students. Based on time and date stamps automatically collected by Survey Monkey, this appears to have happened for the morning FS class. However, for reasons which are not clear, no students completed the survey shortly after the afternoon PS/LS exam preparation class. An e-mail request was sent out to registered students in that class several weeks later. In all 24 students responded to the survey but two people answered only the first (permission) question on the survey, and then answered none of the other questions. Those two responses were therefore excluded from the analysis. Of the 22

usable surveys, only four (4) came from the afternoon PS/LS class students. However, 18 students from the morning class completed the evaluation survey<sup>1</sup>

- 1.5. As a result of inadequate evaluation survey data collection, there are only 22 usable responses to the survey, 18 from the FS class and four (4) from the PS/LS class. Little statistical testing was attempted for the afternoon class, and most of the statistical tests attempted for the morning FS class were unreliable or invalid because of the small number of respondents. Exceptions to this statement (e.g., when a Fisher's Exact Test showed a statistically valid and reliable correlation) are pointed out in the text. For the most part, however, the findings and analyses presented below are based on counts, percentages, and logical conclusions. The sample is non-random and results should not be projected or assumed to apply to all students who took these courses in 2019 or who may take similar ELAC test prep courses in the future.

## Findings

### Demographics

- 2.1. Table 1 shows that Hispanics (Latinos/Latinas) made up the majority of each class. Hispanics were close to three-fourths of the morning class respondents and all of the afternoon class respondents.

**Table 1. Ethnic Distribution of the FS and PS/LS Test Prep Classes Survey Respondents<sup>2</sup>**

Student Ethnicity/"Race"	FS Course		PS/LS Course		Both Courses	
	Number	Pct. of 18	Number	Pct. of 4	Number	Pct of 22
White or Caucasian	3	17%			3	14%
Black or African American	1	6%			1	5%
Hispanic or Latino(a)	13	72%	4	100%	17	77%
Asian or Asian American	3	17%			3	14%
American Indian or Alaska Native					0	
Native Hawaiian or other Pacific Islander	1	6%			1	5%
<b>Total Respondents</b>	<b>18</b>	<b>100%</b>	<b>4</b>	<b>100%</b>	<b>22</b>	<b>100%</b>

<sup>1</sup> Due to a lack of attendance taking, it is impossible to calculate response rates for the survey. From a poll about potential interest in land survey exam prep classes we do know that 42 prospective attendees had expressed an interest in an FS Test Prep class, 34 in the PS/LS class – some of those in both and another 12 had not specified which class they wanted to attend.

<sup>2</sup> The row numbers and percentages do not add up to the Total Respondents numbers in each column because the survey allowed multiple responses to the ethnicity/"race" question. Any cells left blank in Table 1 means that no students in that class identified with that ethnic/"race" group.

- 2.2 Females were well-represented in the summer workshop, as shown in Table 2. Half of the students in each class who responded to the survey identified themselves as women.

**Table 2. Gender Distribution of the FS and PS/LS Test Prep Classes Survey Respondents**

Student Gender	FS Course		PS/LS Course		Both Courses	
	Number	Percent of 18	Number	Percent of 4	Number	Percent of 22
Female	9	50%	2	50%	11	50%
Male	8	44%	2	50%	10	45%
Prefer not to answer	1	6%		0%	1	5%
<b>Total Respondents</b>	<b>18</b>	<b>100%</b>	<b>4</b>	<b>100%</b>	<b>22</b>	<b>100%</b>

- 2.3 The survey also asked about the age of the students who took these exam preparation classes. While passing the FS test is an important step toward professional land surveyor licensure and is often taken by people just before or shortly after completing their college or university study of land surveying, this is not always the case. Multiple research studies have shown that community college students in particular are often older than the assumed to be typical college-going ages of 18 to 22. However, it is possible to work in the land surveying field in assistant roles before taking college classes in land surveying and some people enter land surveying later in life as a second or third career. Table 3 confirms that it is not only younger people who decided to take the ELAC test prep courses.

**Table 3. Age Group Distribution of the FS and PS/LS Test Prep Classes Survey Respondents**

Respondent Age Range	FS Course		PS/LS Course		Both Courses	
	Number	Percent of 18	Number	Percent of 4	Number	Percent of 22
20 to 24	2	11%			2	9%
25 to 29	7	39%	1	25%	8	36%
30 to 34	4	22%	1	25%	5	23%
35 to 39	2	11%			2	9%
40 to 44			1	25%	1	5%
45 to 49	1	6%	1	25%	2	9%
50 to 64	1	6%			1	5%
Prefer not to say	1	6%			1	5%
<b>Total Respondents</b>	<b>18</b>	<b>100%</b>	<b>4</b>	<b>100%</b>	<b>22</b>	<b>100%</b>

- 2.4. After collapsing the data into “under 30” and “over 30” categories additional crosstabulations further explored the relationship of age, gender, and type of test prep course taken. The women who took



either class were significantly more likely than the men to be under age 30.<sup>3</sup> While nearly equal proportions of women and men took each class, this finding is driven by the nine women who took the FS test prep class., eight (8) of whom (89%) were under age 30 (compared to one of two women in the PS/LS class being under age 30).<sup>4</sup> This finding underlines the importance of the ELAC ATE grant in focusing on bringing more women, especially younger women, into the land surveying field.

### **Prior Experience Taking the FS, PS, or LS Exams**

- 3.1. It is relevant to curriculum design of test preparation courses to know if students have previously attempted the tests. It is also relevant to know this information as context for interpreting or statistically testing student ratings or evaluative responses about course delivery. Although there are exceptions, passing the FS exam is generally a prerequisite to taking the national PS test, and passing the PS exam is a prerequisite for taking the California LS exam. Understanding the requirements to take each exam and the sequence of exam taking to become a professional is an important consideration for those who want to become professional land surveyors. Did the respondents attempt, fail or pass any of these test before taking the ELAC test prep course?
- 3.2. Among the 18 FS test preparation class survey respondents, 13 (72%) were eligible to take the FS exam but had not yet attempted it. Four (4) or 22% had previously attempted the FS test but not passed it. One (6%) was taking the FS test prep class even though that person reported that he or she was not yet eligible to take that test.
- 3.3. Among the 18 FS test preparation class survey respondents, 16 (89%) reported that they were not eligible to take the national land surveying exam, although one (6%) indicated that he or she was eligible to take that exam but had not attempted it. One survey respondent didn't answer this question.
- 3.4. Among the 18 FS test preparation class survey respondents, 14 (78%) reported that they weren't eligible to take the California specific Land Surveyor (LS) exam, three (3 or 18%) that they were eligible but had not yet attempted that exam, and one didn't answer. These three responses seem anomalous since passing the FS exam plus experience are the normal pre-requisites for taking the national PS exam and the California state specific test. According to the NCEES website the California rules for taking the state specific LS test have "recently" changed to require passing the national exam before taking the LS exam. So there could be a timing issue in changing rules or regulations or the three individuals discovered during the FS Test Prep class discovered during the course that they fell under one of the exceptions for taking the national PS test specified on the NCEES website and had not realized it. Therefore they answered in the survey that they were eligible but hadn't taken the national PS exam. Or they might simply have misunderstood the rules.

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<sup>3</sup> Fisher's exact test significance = .002 one-sided or two-sided.

<sup>4</sup> The under 30/over 30 age difference of women and men was statistically significant for those in the FS test prep class (Fisher's Exact Test significance = .003 either one-sided or two-sided), but not significant for the afternoon PS/LS tests prep class.

### **Prior Land Surveying Education and Experience Before Taking the FS Test Prep class**

- 4.1. In order to gain some further insight into who was taking the FS Test Prep class and when they were taking it, those who took the FS Test Prep class were asked a series of questions related to qualifications for taking the FS exam. Exploration of various permutations and combinations of responses to these questions would also be relevant to determining if an FS Test Prep class student met exceptions under which they could attempt the FS Test, or even be quickly eligible to take the national PS and state specific LS test once they had passed the FS Test. We have not done that exploration yet pending further discussion of what is of interest to the project co-PIs. Table 4 shows the self-reported amount of education and experience of students who took the 2019 FS Test Prep class at ELAC. What is reported in Table 4 would have to be verified before the student would be allowed to take the FS exam, much less the more advanced exams.

**Table 4. Self-Reported Prior Education and Experience with Land Surveying**

	<b>Yes</b>	<b>No</b>	<b>Total</b>	<b>No Answer</b>
A high school diploma or GED	100%		100%	0
An Associate degree in a STEM field	53%	47%	100%	1
An Associate degree in a non-STEM field	18%	82%	100%	1
A Bachelor's degree in a STEM field	33%	67%	100%	0
A Bachelor's degree in a non-STEM field	6%	94%	100%	2
2 years of postsecondary land surveying education	39%	61%	100%	0
2 or + yrs of land surveying related work experience	44%	56%	100%	0
A combination of postsecondary land surveying education and land surveying related work experience totaling two years	44%	56%	100%	0

- 4.2. Summarizing Table 4, the students taking the FS Test Prep class all had high school diplomas or GEDs. However, further analysis showed that more than a third (seven (7) of the 18 students or 39%) had only a high school diploma or GED and no Associate or Bachelor's degrees. Also, of those seven only three (or one-sixth of the 18 students in the class) reported having two years of postsecondary (college level) education. Two of the seven had previously attempted the FS exam but not passed. There are various exceptions that would allow someone with work experience in land surveying but little or no education in it to take the FS Test. However the situation of one to three of the students in the FS class might need further clarification and verification since while they indicated that they were eligible for but had not taken the course, they did not seem to meet the appropriate combinations of education and/or experience that would let them do so. The exceptions are confusing to read on the NCEES website and might not have been fully covered in the class, or the students or the evaluator may not have understood them. In any case eligibility to take the FS exam might be

more fully probed with future FS Test Prep class students and/or the survey modified for future use.

- 4.3 The majority of the FS Test Prep students had either an Associate or a Bachelor's degree (or both). Over half (53%) of all respondents had an Associate degree in a STEM field, compared to one-third with a Bachelor's degree in a STEM field. Relatively few students with Associate degrees in non-STEM fields (18%) or Bachelor's degrees in a non-STEM field (6% or one student) took the 2019 FS Test Preparation course. The overall impression is that at least in the 2019 class those interested in taking the first step toward a land surveying profession had limited college level education.
- 4.4. Less than half (44%) of the class reported having two or more years of land surveying related work experience. Also, less than half (44%) of the students reported having a combination of postsecondary (college level) land surveying education plus land surveying related work experience totaling two year. For over half of the students (56%) the FS Test Prep class was taken with limited practical knowledge of work as a land surveyor.
- 4.5. In a series of crosstabulations to check background differences by gender, only one proved to be statistically significant for this class. Two-thirds (66.7%) of the females in the class reported having two years of postsecondary (college-level) land surveying education, while 87% of the males indicated that no, they had not had two years of postsecondary college-level land surveying education.<sup>5</sup> In other words, the women in the class were significantly more likely than the men to have had land surveying courses at the college level. While the difference was not statistically significant, more of the men would have gotten ready to take the FS exam solely through their experience in practicing in the land surveying field, or courses taken at the high school level. This insight might be helpful when marketing to students who might want to take future FS test prep classes. Given that the NSF ATE grant has a special focus on recruiting more women into land surveying, focusing FS Test Prep recruitment or encouraging of women in college level land surveying classes might be especially appropriate for reaching grant goals.

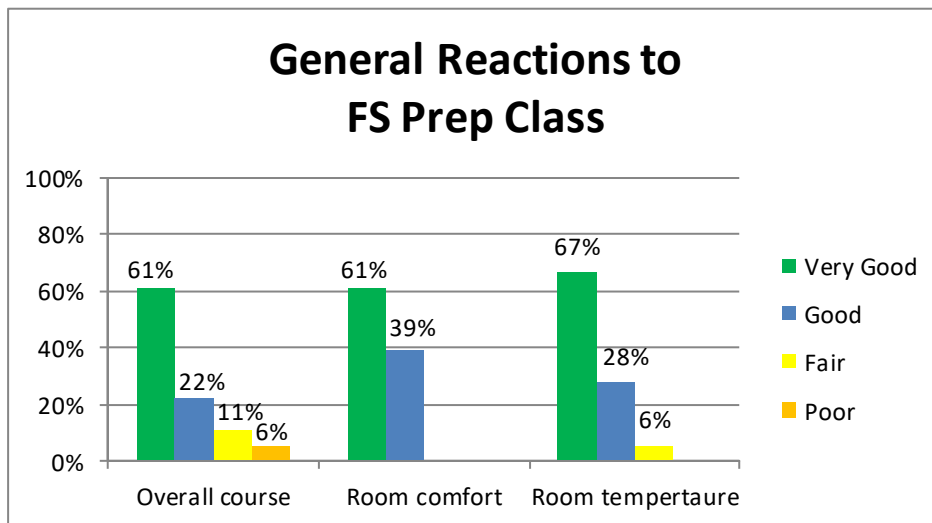
### **Student Ratings of the FS Test Prep class**

- 5.1. Overall, the general student reaction to the morning FS Test Prep class was quite positive. As shown in Chart 1, 83% of the students rated the overall course "Very Good" or "Good". All thought that the room comfort was "Very Good" or "Good" and in particular 95% felt that the room temperature was "Very Good" or "Good".

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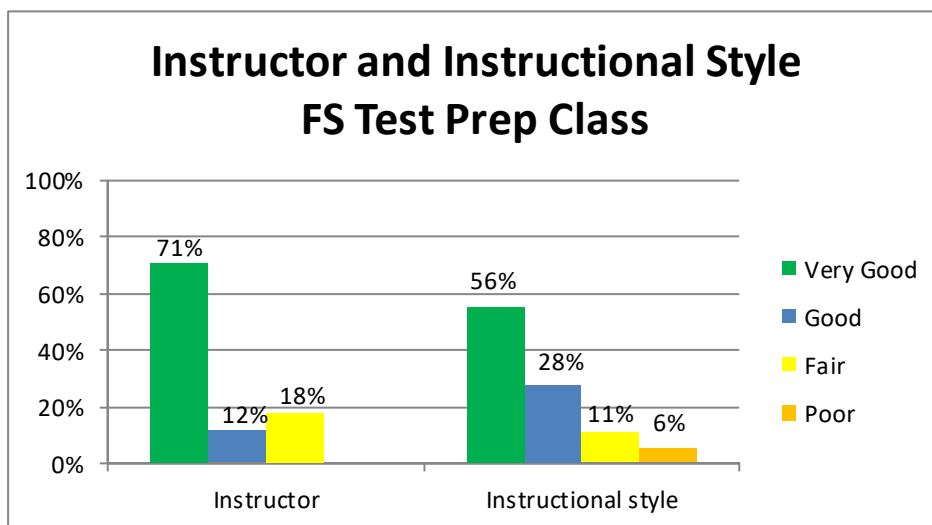
<sup>5</sup> Fisher's Exact Test, exact significance = .036, one-sided, .050 two-sided.

**Chart 1. General Reaction to FS Test Prep Class<sup>6</sup>**



5.2. The students in the FS Test Prep class also rated the instructor, Mr. Hernandez, highly. As shown in Chart 2, 83% rated the instructor as “Very Good” or “Good” and 84% rated his instructional style that way, although fewer students rated it “Very Good.”

**Chart 2. Instructor and Instructional Style Ratings, FS Test Prep Class**

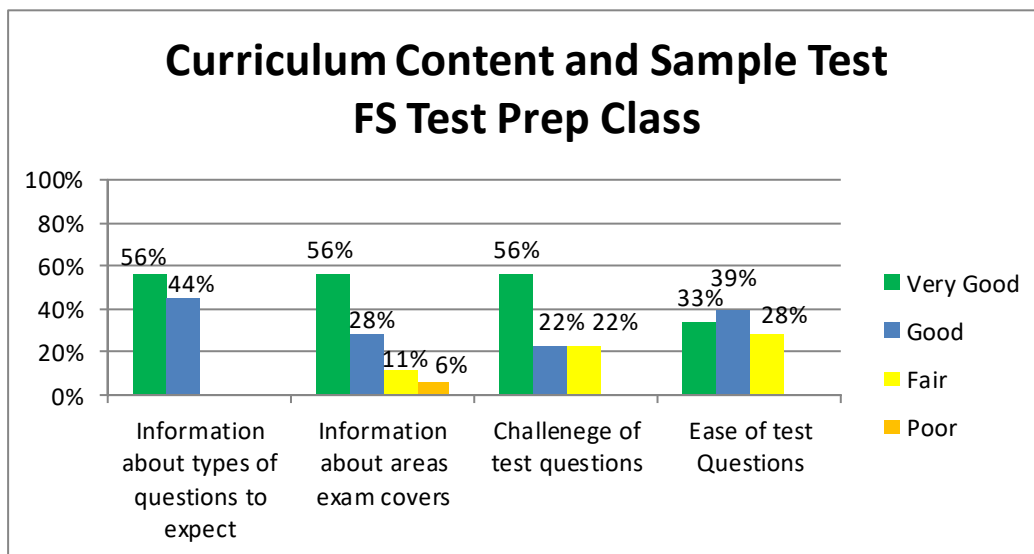


<sup>6</sup> The charts about the FS Test Prep class show percentages for comparison across sub-questions. However, since there were only 18 respondents and five Likert style response categories (“Very Good” to “Very Poor”), it is important to understand that 6% means only one person responded this way, and 11% only two people responded that way.

There was a significant, very strong correlation between the general rating of the instructor and of the instructional style.<sup>7</sup> The three students who rated the instructor as “Fair” were the only ones who rated his instructional style as “Fair” or “Poor.”

- 5.3. As reported earlier, only four students had previously attempted the actual FS test, so for most students the evaluation of the curriculum content and the practice test itself is based solely on the experience that day with the one practice test. The numbers involved are too small to yield valid and reliable statistical results, but on the question concerning areas that the exam covers the four people who had previously attempted the FS test were evenly split between rating the course as “Very Good” and as “Fair” in this respect.

**Chart 3. Ratings of Test Prep Course Curriculum Content and Sample Test**



- 5.4. As shown in Chart 3 all of the students rated the information in the workshop about the types of questions to expect as “Very Good” or “Good.” In addition, 84% rated the information relayed about the areas that the exam covers as “Very Good” or “Good.” One would want a sample test to be representative of the actual exam and neither too easy nor too hard. While most students had not yet tried to take the actual FS exam, 78% felt that the sample test was “Very Good” or “Good” in including challenging test questions, with the rest finding it “Fair” in doing so. While one-third of the students found the ease of the test questions to be “Very Good,” 39% rated that “Good” and over one-fourth (28%) Fair. Since 72% of the students used the top two ratings, this is about what one would expect from any Likert-style question. An interpretation is that it is a positive result since one would not want results skewed too positively if the questions were too easy, or too negative if the test questions were so hard as to viewing their ease as “Poor” or “Very Poor.” We deduce logically that with their prior preparation and then the review class students felt prepared to attempt the test to the

<sup>7</sup> Gamma = 1.000, approx. T = 3.580. Approx. sig. < .001.

best of their individual abilities and understanding of the subject matter.

### **Qualitative Responses to the FS Test Prep Class**

- 6.1. Five open-ended questions in the survey asked students to provide more qualitative responses about the 2019 FS Test Prep class. The responses are shown in Tables 5 to 9 below in the words of the students themselves. They are sorted only to the extent of showing related comments together.
- 6.2. As shown in Table 5, students felt that the best things about the course included the topics covered; and a knowledgeable instructor who answered all questions, went over solutions to sample questions and provided a sample test. He also explained terminology, taught test taking tips, and generally provided information that the students didn't have to spend time looking up online. These are the positive aspects of his teaching style. Fourteen of the 18 students who took the survey (78%) responded to this open-ended question.

**Table 5. Best things about the FS Test Prep Class**

Covers the topics of the test
Topics covered
Good questions to solve
Practice exams and going over solutions.
The Exam Examples and book references provided
Sample Exam Qs, knowledgeable instructor, study references
Instructor very knowledgeable
Instructor was able to answer all the questions asked.
It was free information that I didn't have to struggle getting information online.
Key points to help with test passing
The little tips/tricks about test/surveying that wouldn't be able to Google or know (eg, best books, what exam was actually like, how to break down studying, etc)
Terminology
Information
Very informative
No Answer (4, 22%)

- 6.3. Table 6 below shows what students viewed as the worst things about the class. The major problem with the course had to do with time. Some students felt that the introduction portion of the course took, delaying the start of doing questions, which in turn limited the time available to explain how to answer the questions and the number of questions covered. One student felt that some of the questions might have been answered in emails or after class. Another student noted that he or she had not done sufficient preparation before the class.

**Table 6. Worst things about the FS Test Prep Class**

Instructor ran out of time
not long enough
More time needed
Time ran short.
Not worse, but I felt that the introduction portion of the course could have been faster.
Introduction portion took lots of time.
Didn't go over that many questions. Took too long to start doing questions.
Not enough time of explaining how to answers to questions
Not enough time to do test questions
Students had too many questions took too much time that was supposed to be used on talking about the test problems. Instructor should have limited the time for those questions. Many of those questions could be answered in emails or after class.
My lack of preparation beforehand
Too early
No food
n/a
None
No Answer (3, 17%)

- 6.4. Table 7 shows comments that the FS Test Prep class students made about things that were okay but could have been better. Fewer people (10 of 18 or 56%) answered this question and four (22%) gave variations of responses suggesting that in their opinions the question was not applicable. The most common comments again focused on not having enough time. In particular, a few students felt it would have been better to get more quickly to questions that might come up on the exam and go over them, including the more difficult math problems. One suggestion was to poll the students ahead of time about what they might already know and identify areas so that the instructor could focus more specifically on areas that more students found problematic.

**Table 7. Things about the FS Test Prep class that Were Okay but Could Have Been Better**

need more time
More time
The introduction ran a bit long. Would have been better if we went straight into the questions that are possible to come up on the FS exam.
I understand that the instructor needs to know his audience before giving the class but since we only had 4 hours to cover all the subject I felt that we (the students) could have provided our info previously, maybe in a questionnaire when signing up for the course.
Going over some of the harder math problems (actually solve step by step)
Lectured more on the content of questions rather than introduction to each other
n/a
N/a
None
Nothing
No Answer (8, 44%)

6.5. Table 8 shows student comments about what they struggled with during the FS Test Prep class. Apparently the class generally went well for most students since half of the class gave no response to the question at all and two more wrote that the question was not applicable. Three students commented about the practice test, noting some typos and having questions about some of the questions on it. Two people struggled with the mathematics problems, especially the harder ones. One student struggled with terms and another had trouble hearing what was being said.

**Table 8. What Students Struggled With in the FS Test Prep Class**

Lack of help with content of the test
Some questions on the test (but ok)
The typos found on the practice exam.
Math. Always the math portion.
The harder math problems
Terms
hearing what was being said
n/a
N/a
No Answer (9, 50%)



- 6.6. Table 9 presents student views on what was not clear to them. The class was generally clear to most of the students since half didn't answer the question and five more (28%) wrote down variations of responses that nothing was unclear. One student complimented the instructor, writing that "He was very clear. He really knew what he was talking about." One student was concerned about what "FS" and "LS" stood for, another made a vague reference to "The content of the test," and a third mentioned some problems that he or she personally needed to work on.

**Table 9. What Wasn't Clear in the FS Test Prep Class**

On the original email, I was confused on what the FS and LS stood for.
The content of the test
Some problem I personally need to work on.
He was very clear. He really knew what he was talking about.
n/a
N/a
None
Nothing
Nothing
No Answer (9, 50%)

- 6.7 A positive outcome of a test preparation class might be helping students identify topics or areas that they needed to review further before taking the actual test. As shown in Table 10, just over half (56%) of the students gave a variety of self-reflective, personalized answers.

**Table 10. What Students Say They Need to Review More after the FS Test Prep Class**

More review on the challenging questions that were found on the practice exam
more test questions
Once I look over the study guide I'll have a better sense.
All of it! Maybe more terminology.
I need to study more theory
Legals
Literature
MATH
Specific areas of focus for test
The mechanics of applying for the test
N/a
No Answer (7, 39%)

### **Alternative FS Test Prep Class Formats**

- 7.1. The survey also explored student preferences regarding eight alternative ways of presenting an FS Test Prep class. The results are shown in Table 11, sorted from high to low percentages of “Yes” and then “Maybe” responses. All survey respondents in this class or all but one responded to each of these questions.

**Table 11. Preferences for Alternative FS Test Prep Class Formats**

	<b>Yes</b>	<b>Maybe</b>	<b>No</b>
More time for the course, but in one day	61%	17%	22%
A pre-recorded online course without a live instructor, available anytime (like a video)	61%	0%	39%
A two-day course	59%	18%	24%
An online course on a specific day and time with a live instructor (like a live webinar)	50%	17%	33%
Lecture/discussion followed by a sample test	44%	44%	11%
A lecture/discussion format	39%	44%	17%
A course held on a different day of the week	11%	11%	78%
A course starting at a different time of the day	6%	0%	94%

- 7.2. As shown in Table 11, while there is a large amount of interest in an online FS Test Prep class, there is also more objection to that kind of a class than there is to an in-person class. The time of the day and day of the week (on a Saturday, starting in the morning) is preferred over a different day or starting time for an in-person course. The top preference (61% “yes” and 17% “maybe”) is to have more time in the course in one day, although offering a two-day course comes in a close second for an in-person course (59% “Yes” and 18% “Maybe” with 17 rather than 18 respondents). Opinions are split between having a pure lecture/discussion format as opposed to a lecture/discussion followed by a sample test, with a slight preference for the latter (the current class format).
- 7.3. If ELAC were to decide to offer an online format for the FS Test Prep class, an online course held on a specific day and time with a live instructor (comparable to a live webinar) would be preferred over a pre-recorded course available anytime without a live instructor (comparable to a video of a webinar). Two-thirds of the students (67%) gave a “Yes” or a “Maybe” response to the former option, compared to 61% who favored the latter option. The difference in the online formats is in the potential for a real-time live interaction between the students and the instructor (e.g., questions and answers).

### **Potential Timing of Actual FS Test Taking**

- 8.1. For this kind of a course, the best evaluable outcome would be that the students in the course attempt the actual FS exam, with “success” measured in relation to whether a greater percentage of them pass the exam at a rate higher than the national rate. At least some of the credit for the higher pass rate could be attributable back to the Test Prep course exam should that take place. If a lower proportion of students passed the actual FS exam after taking the FS Test Prep class one would want to know why that took place and whether some or all of the FS Test Prep class needed to be improved.
- 8.2. The evaluation survey was taken shortly after the class was completed so actual FS exam taking and analysis of the results for this class has to wait for the future. However, other factors might intervene that would prevent the workshop students from taking the actual FS exam at all. The best that can be done at this point in time is to explore student intention to take the FS exam. The results of a series of questions related to intentions regarding taking the FS exam are shown in Table 12. Over half (56%) of the respondents intend taking the FS exam more than one to six months after the class (held on September 21). Over one quarter of the students (28%) plan to take the test six months or more later.<sup>8</sup>

**Table 12. Timing and Intentions Regarding Taking the FS Test**

	<b>Checked</b>	<b>Pct. of 18</b>
In the next month or earlier	1	6%
In more than one to six months from now	10	56%
In over six to 11 months from now	3	17%
A year or more from now	2	11%
The next time it is offered	0	0%
When I have enough money to afford the fee	2	11%
I'm not sure	1	6%
I don't intend to take the LS test <sup>9</sup>	1	6%

### **National PS and California LS Test Prep Class Findings**

- 9.1 The next several sub-sections report what the four (4) students who took the afternoon test prep class thought about it. Since there are so few respondents we have not checked for statistical significance of male/female or other breakdowns of responses. As reported in paragraphs 2.1 and 2.2. above, all four of the survey respondents from this class are Hispanics, with half identifying themselves as women (Latinas) and half as men (Latinos). The age range of the respondents, shown in Table 3,

<sup>8</sup> Although multiple responses were allowed, no one checked both of these categories.

<sup>9</sup> This prompt was an error in the survey. It should have been written “FS test” and we don’t know if the students interpreted it that way or as written.

paragraph 2.3 above, is 25 to 49, evenly split between four five-year intervals, with no one in the 35 to 39 year old age range. Because of the small number of respondents the results are reported below shows raw counts rather than percentages.

- 9.2. All of the students in the afternoon PS/LS Test Prep class had already passed the FS exam; No one had obtained a waiver for it. All had obtained “Land Surveyor-in-Training” certification. One had attempted and passed the national PS exam and passed it (in another state) and had also attempted but not passed the California specific LS exam. Two were eligible for both those exams but had not yet attempted them. One was eligible to take the national PS exam but had not yet taken it and perhaps correctly indicated that he or she was not eligible to take the California specific LS exam. Current rules in California are that one must pass the national PS exam before attempting the California specific LS exam so that person is correct under current rules. It is possible but not apparent from survey results that the other two individuals who had not yet attempted the national PS exam were somehow “grandfathered in and so somehow eligible to take the California LS exam, or they might have misunderstood current rules for attempting the state exam.
- 9.3 The PS and California specific LS tests are the final exam hurdles to pass before filing paperwork and paying a fee to become a Professional Land Surveyor in California. All students in the advanced afternoon class who did the survey reported already having passed the FS test. Table 13 provides further information about their several educational backgrounds. Two of the survey respondents only had a High School Diploma or GED. One had a Bachelor’s degree in a STEM field and another a Bachelor’s degree in a non-STEM field, but none had graduated from a four-year program in land surveying with a Board Approved curriculum. Also, none had become licensed Civil Engineers (so were not pursuing dual licensure when they took the PS/LS Test Prep class).

**Table 13. Afternoon PS/LS Test Prep Class Student Self-Reported Prior Education**

	<b>Yes</b>	<b>No</b>	<b>Not Applicable</b>
High School Diploma or GED	4		
Bachelor's degree in a STEM field	1	2	1
Bachelor's degree in a non-STEM field'	1	2	1
Graduated for a program in land surveying with a four-year Board-approved curriculum		3	1
Become a licensed Civil Engineer		3	1

- 9.4 In addition to the requirement of having passed the FS test, NCEES requires experience as a Land Surveyor-in-Training before allowing a person to take the PS test. In specific circumstances NCEES allows experience to substitute for formal education in land surveying, but it also requires formally educated Land Surveyors-in-Training to gain experience before taking the PS test. The survey asked a question about experience levels in order to get a sense of how close the afternoon class students were to having the specified amount of experience that would make them eligible to take the PS test. The results are shown in Table 14. The question specified that the respondent should exclude any

years spent studying land surveying in a curriculum program. Each of the four students had five or more years of experience in land surveying, and three had five or more years in a position responsible for field training or a position responsible for office training in land surveying activities.

**Table 14 Full-time Experience in Land Surveying Outside of a Land Survey Curricular Program**

	One Year	Two Years	Three Years	Four Years	Five Years	Six or more Years
in doing land surveying					1	3
in a position responsible for field training	1				1	2
in a position responsible for office training			1		1	2

**Ratings of the Afternoon PS/LS Test Prep Class**

- 10.1 Preparation for the California state specific exam was rated more highly (two “Very Good” and one “Good” ratings) than preparation for the national exam (one “Very Good” and two “Good” ratings) but overall the rating of the course was positive. Only one survey respondent rated preparation for both exams as “poor.”
- 10.2. Ratings of the national PS test preparation are shown in Table 15. Overall the class was well-received. The instructor was awarded the most “Very Good” ratings and all other aspects of the national Land Surveyor Test Preparation part of the afternoon class were more often rated “Good” rather than “Very Good.” The same person who rated the class as “Poor” rated each aspect of the class as “Poor” in regards to the national Land Surveyor Test Preparation. That person is an outlier in his or her opinions about the course.

**Table 15. Ratings of the National Land Surveyor (PS) Test Preparation Part of the Class**

	Very Good	Good	Fair	Poor	Very Poor
Instructor	2	1		1	
instructional style	1	2		1	
Information about areas exam covers	1	2		1	
Information about types of questions to expect	1	2		1	
Ease of answering practice test questions	1	2		1	
Challenge of practice test questions	1	2		1	
Clarity of practice test questions	1	2		1	

- 10.3. Ratings of the California Specific LS test preparation are shown in Table 16. Only three (3) of the four individuals answered these questions. It was always the same individual who didn’t respond to

them. It was always the same individual who gave a ‘Poor’ response for each question. Therefore, half of the survey respondents in this class gave the class high ratings while half gave it a ‘Poor’ rating all around or no rating at all in regards to the California state specific test preparation. In response to these questions, the two people who gave the highest class ratings did so for the instructional style, information about areas the exam covers, and information about the types of questions to expect in the state specific exam. The instructor and the other questions all received equal numbers of ‘Very Good’ and ‘Good’ responses.

**Table 16. Ratings of the California Specific Land Surveyor (LS) Test Preparation Part of the Class**

	Very Good	Good	Fair	Poor	Very Poor
instructional style	2			1	
Information about areas exam covers	2			1	
Information about types of questions to expect	2			1	
Instructor	1	1		1	
Ease of answering practice test questions	1	1		1	
Challenge of practice test questions	1	1		1	
Clarity of practice test questions	1	1		1	

10.4. Qualitative responses concerning why the students provided these ratings on these questions are given in Table 15. The person who gave the ‘Poor’ responses chose not to respond to this open-ended question and also to a set of five other open-ended questions, other than to declare them ‘n/a’ (not applicable). One person chose not to respond at all. The other two responses were ‘Instructor Preparation’ and ‘It was stated that the exam would be based on boundary determination. That’s what the questions were on, so they were relevant questions.’

### **Other Qualitative Responses about the PS/LS Test Prep Class**

11.1. An earlier set of qualitative questions in the survey asked about the best and worst aspects of the afternoon PS/LS Test Prep Class and what was ‘oaky but could have been better. The person who rated all aspects of the afternoon class ‘poor’ chose to provide no further explanation than ‘n/a’ to each of the qualitative question. Therefore the responses below are all from people who rated the class and its specific elements as ‘Very Good’ or ‘Good’ (or provided no rating at all regarding the California state specific LS Test preparation).

11.2. The best thing about the afternoon course was the instructor. Three people mentioned this and two declared him to be ‘knowledgeable’ or ‘very knowledgeable.’

11.3. The worst things about the course all related to time. One commented ‘Too short,’ a second wrote ‘Need more time’ and a third person wrote ‘lack of time seemed rushed.’

- 11.4. The answers about what was “Okay but could have been better” were consistent with the responses about lack of time being the worst thing about the course. In response to this open-ended query one person wrote “More time,” and a second specified “Two or three day course.” The third person wrote philosophically “with the given amount of time of prep, everything was as it should’ve been.”
- 11.5. The three substantive responses regarding “What I struggled with” were “Some terminology,” “Lacking knowledge,” and “Finding the room!”
- 11.6. Two people responded to the question “What wasn’t clear.” One person wrote “How to fill out an application to take test.” The other wrote “Not sure. He was very thorough.”

### **Retrospective Pre-Test and Post-Test Look at PS and LS Test Review Needs**

- 12.1. In an attempt to better understand whether the afternoon PS/LS Test Prep class was meeting perceived student needs for review or surfacing a new understanding of what students needed to review the survey included a “retrospective pre-test” set of questions followed by a post-class look at need to review the same items. The areas identified were abstracted from a description of the national PS test on the NCEES website. Choices of “All of the above” and “None of the above” were added by the evaluator. The results are shown in Table 17.

**Table 17. Student Perceptions of Review Needs Before and After the PS/LS Test Prep Class**

	<b>Before</b>	<b>After</b>	<b>Same Respondents?</b>
Mathematics of Land Surveying	0	0	Yes
Regulations and statutes	1	1	No
Work processes of land surveying	0	0	Yes
Client relations during land surveying	0	0	Yes
Ethics of land surveying situations	1	1	Yes
Professional land surveying behavior	0	0	Yes
California state specifics	1	1	No
All of the above	1	2	Yes and No
None of the above	0	0	Yes

- 12.2. Interpreting Table 17 is somewhat complicated in that aggregate totals are shown for how many of the four students in the class checked off a category as one needing review. However, the underlying question is whether these were the same individuals or not. This was explored by doing nine crosstabulations of the responses to questions 17 and 18 of the survey. In the areas of the Mathematics of Land Surveying, Work processes of land surveying, client relations during land surveying and professional land surveying behavior none of the students felt a particular need for review either before or after the PS/LS Test Prep class. This should not be interpreted to mean that covering those areas wasn’t worth the students’ and instructors’ time. It could indicate that the PS/LS



class was confirmatory – that is, the class might have confirmed to students already well-versed in these areas that they knew enough to be able to pass the PS and LS tests. That could be a confidence builder encouraging the students to attempt the tests.

- 12.3 No students checked off “none of the above” either before or after the class. There were four responses before the class of areas that students thought were in need of review, and four areas afterward, including “All of the above.” That is, the course confirmed to some students that at least some overall review was needed before taking the tests even after the class. One student had come to this conclusion before even taking the class. That student maintained his or her opinion after attending the class. Another student reported not feeling that way before taking the class but decided by the end of the class that he or she should take an overall review of all of the topics before taking the PS and LS tests.
- 12.4. One student had recognized a need for review of regulations and statutes related to land surveying before taking the class but not afterward. Similarly, one student felt a need for review of California state specifics related to land surveying before taking the class, but not afterwards. One can deduce that for these students the class may have satisfied their need for a review in these areas or confirmed that they knew enough already. However, one student had not recognized a need to review regulations and statutes related to land surveying before taking the class decided by the end of it that they did need such a review before taking the tests. Similarly, a student felt that he or she had not needed a review of California state specifics before taking the class, but by the end of it felt that such a review was necessary for him (perhaps in order to pass the California specific LS test needed to be licensed as a Professional Land Surveyor in California).
- 12.5 One student had identified a need for him or her to review the Ethics of land surveying situations before he or she took the class, but still felt a need for further review of ethics after taking the class before taking the national PS or the California specific LS exam. This could be an individual who is especially sensitive to or interested in ethics, or someone who had not had to think about ethics much before taking the course and depending on an understanding of the topic during the class. Since there was only one student who responded this way, and only four students responded to the survey, it is possible but not certain that the 2019 class included an appropriate amount of attention to land surveying for most students to feel confident that they could pass the two exams without much further ethical review.

### **Confidence Builders**

- 13.1. The survey asked students to compare how confident they were before the course in seven areas that the exam would cover to how confident they are after taking the PS/LS Test Prep course. The responses are shown in Table 18. Everyone gained confidence at least “somewhat” about the test in all examination areas. One person gained “a great deal” of confidence in the California specific land surveyor test and another “a fair amount.” Two people gained “a fair amount” of confidence in their understandings of regulations and rules, and/or work processes of land surveying. In all other areas one person gained “a fair amount” of confidence and three improved their confidence “somewhat,” with one exception. All four somewhat improved their ability to analyze ethics of situations.



**Table 18. Amount of Improvement in Confidence about PS/LS Test Taking**

	<b>A great deal</b>	<b>A fair amount</b>	<b>Somewhat</b>	<b>Not very much</b>	<b>Not at all</b>
Mathematics of land surveying		1	3		
Regulations and rules		2	2		
Work processes of land surveying		2	2		
Client relations during land surveying		1	2		
Analyzing ethics of situations			4		
Professional land surveying behavior		1	3		
California specific land surveyor test	1	1	2		

**Expectations for Taking the National PS Exam and the California Specific LS Exam**

- 14.1. The ELAC NSF ATE grant has an ultimate goal of increasing the number of Land Surveyors, and specifically the number of Hispanics and women in land surveying. All of the survey respondents for this class are Hispanics and half are women. Taking and passing the PS and then the LS tests, filing and paying a fee to obtain the California Land Surveyor license and the final steps in becoming a professional Land Surveyor in this state. The class was funded by the NSF ATE grant and is a contribution that the grant can make to more advanced Land Surveyors-in-Training to help them past the final hurdles to become a professional Land Surveyor. A measure of success of the NSF ATE grant would be if students in the class took and passed the PS and LS exams at rates higher than the national and state averages. When might that measurement be available?
- 14.2. The survey asked students in the class if and when they intended to take the national PS test and the California specific LS test.<sup>10</sup> The results are shown in Table 19. Although the survey allowed respondents to indicate if they didn't intend to take one or the other of the tests or weren't sure when they would take them, no one checked off those answers. In other words, every respondent intended to take both exams and specified a target time period in which to take them.

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<sup>1010</sup> The exact wording in the survey referred to the "National LS test" and the "California specific test," which may have caused some confusion. This will be corrected in future versions of this survey so that the two exams are more clearly distinguished.

**Table 19. Expected Times When PS/LS Test Prep Class Students Would Take the Tests**

	<b>National PS Test</b>	<b>California LS Test</b>
In the next month or earlier		1
In more than one to six months from now	2	
In over six to 11 months from now	1	2
A year or more from now		2

- 14.3. Only one student (the person who had already passed the national PS test in another state) intended to take the California specific LS test in the next month or earlier after September 21, 2019. If that person passed the LS test she or he would be the first among the survey respondents able to be licensed as a professional Land Surveyor in California. Two planned to take the national exam between one and six months from September 21, 2019 and one over six months to 11 months from then. Two students intended taking the California specific LS test over six to 11 months after September 21, 2019 and two planned to take that exam a year or more later. Given these results and when national PS Test results are released, it may be possible to compare class pass rates and national pass rates as early as the July to December 2019 period, then again for the January to June 2020 and July to December 2020 time periods. If California specific LS test rates are available for comparison, these might be checked for those two time periods as well as the January to June 2021 time period.

### **Alternative Formats for the PS/LS Test Prep Class**

- 15.1 The survey also explored student preferences regarding eight alternative ways of presenting a PS/LS Test Prep class. The results are shown in Table 20, sorted from high to low percentages of “Yes” and then “Maybe” responses.
- 15.2. The unanimous consensus of the survey respondents was that the PS/LS Test Prep class is that the class should be made into a two-day course. Since only one person felt that the course might be held on a different day of the week the best way to schedule might be on two Saturdays. Also, since only one person felt that the course might start at a different time of the day, the best way to schedule might be on two Saturday afternoons. However, one person suggested allowing more time for the course in a single day, and one person indicated that this might be possible, although the other two specified “no,” don’t do that. Two respondents favored an online course on a specific day and time with a live instructor, although two others rejected that format. Only one respondent favored a pre-recorded online course available anytime without a live instructor, although a second thought that might be acceptable, with two people rejecting the idea. A lecture/discussion format trumped having a lecture/discussion followed by a sample test.

**Table 20. Alternative PS/LS Test Prep Class Formats**

	<b>Yes</b>	<b>Maybe</b>	<b>No</b>
A two-day course	4	0	0
An online course on a specific day and time with a live instructor (like a live webinar)	2	0	2
More time for the course, but in one day	1	1	2
A pre-recorded online course without a live instructor, available anytime (like a video)	1	1	2
A lecture/discussion format	1	1	2
Lecture/discussion followed by a sample test	1	0	3
A course held on a different day of the week	0	1	3
A course starting at a different time of the day	0	1	3

### Discussion and Evaluator Conclusions

- 16.1 ELAC did well in reaching the intended grant target populations of Hispanics and women for both the FS Test Prep course and the PS/LS Test Prep classes. While advertising the course to current or former college students is appropriate for both courses, marketing the PS/LS Test Prep class to current Land Surveyors-in-Training is more likely to result in male than female enrollment at present, perhaps because there are currently so many more men than women in the field. This could change over time, but perhaps not during the grant period. That the Hispanic enrollees are high for both classes could be a factor of location of ELAC in and near predominantly Hispanic and Asian neighborhoods. Marketing the course more broadly might yield more students but also lower the proportion of Hispanics in the course. A grant goal is to increase the overall number of land surveyors so it would not necessarily be inappropriate to increase total course enrollees but have lower proportions of Hispanics or women. This is a tension that might be considered when developing course marketing strategies and the solution might change from year to year.
- 16.2. The numbers of survey respondents are very small, which makes it harder to draw firm conclusions from the data. However, we observe in Table 3 that the variance in age is greater among those taking the FS Test Prep class than among those taking the PS/LS test prep course. Also, half (50%) of those taking the FS Test Prep class are under age 30, compared to a quarter of those taking the PS/LS test prep course and that the youngest person in the afternoon class was in the age 25 to 29 range. After collapsing the data into “under 30” and “over 30” categories a Fisher’s Exact Test found that the differences in test taken by age ranges were not statistically significant. In other words, people of any age might be interested in either class. However, it is logically consistent that those taking the more advanced PS/LS test prep class tend to be older because of the experience requirement for taking those tests. The greater variance in the age ranges of those taking the FS Test Prep class may be an indication that the course could be of interest not only to those who have recently been studying land surveying in college or high school, but also to people who have been working in the land surveying field in some capacity, or in some other field, for a while and have become interested in becoming a professional land surveyor.

- 16.3. These insights are potentially relevant to how the two classes might be marketed. The FS Test Prep class should be brought to the attention of those taking land surveying courses, but might also be fruitfully marketed to older adults inside and outside surveying who might be interested in entering the land surveying field (including as a second or third career). Older adults are welcome and not unusual to find in community colleges so might also be encouraged to take ELAC land surveying courses and then the test prep course. Because of the experience requirements for taking the national PS and then the California Specific LS exams, the PS/LS test prep course might most appropriately be marketed to both younger and middle-aged people working in the land surveying field, especially as Land-Surveyors-in-training (i.e., they already passed the FS exam) and former ELAC high school and community college Land Surveying course takers as a way to help them obtain their professional Land Surveyor license and in doing so improve their job responsibilities and incomes. One tactic to accomplish this might be to keep lists and e-mail addresses of students from high school and community college Land Surveying courses offered by ELAC and periodically contact them to keep in touch, and do e-mail blasts to the lists when the Test Prep classes are offered.
- 16.4 In this survey at least land surveying appears to be more of interest to those with only a high school diploma, or an Associate degree in a STEM field (not necessarily land surveying) than to those who have earned a baccalaureate degree. While this might change over time, those groups appear to be the primary market for the classes during the grant period. No one had become a licensed Civil Engineer before taking the PS/LS Test Prep class. Although the number of respondents is too small to draw firm conclusions, marketing the PS/LS Test Prep class to Civil Engineering students or licensed practitioners did not stand out in this survey as a fruitful tactic.
- 16.5. The FS Test Prep class, its instructor, and instructional style were well-received. The challenge of the test questions was good to very good, but the ease of solving them less so. Interpreting the latter result may need further exploration with the students as to what they meant. The question itself might have been ambiguous or confusing. That the teacher provided examples, study materials, and references was singled out by the students as especially helpful to the students in the FS Test Prep class and should be repeated in future offerings. Interactions with the instructor were valued but some complained that unprepared students took up too much class time. This might be avoided to some extent in the future if some of the study materials and references were e-mailed ahead of time to class enrollees and the students encouraged to look them over and come to class with more informed questions about areas in which they were having difficulty. The instructor might also survey or encourage FS Test Prep class enrollees ahead of time in an effort to identify the topics with which more of the class was struggling or needed review.
- 16.6. The amount of time available was an issue for both classes. Extending the FS Test Prep class to a full day (or more) and considering holding the PS/LS class over two days (perhaps consecutive Saturdays?) could address that student concern, if feasible.
- 16.7. If feasible, ELAC might consider offering either class in an online format with a live instructor, on a specific day and time. If using online course delivery that would be preferable to a pre-recorded online course available at any time (similar to a video). The difference is in the

possibility of interaction with the instructor. However, any online course offering had more opposition than in-person instruction, so the cost/benefit of preparing to teach online should be weighed carefully. An option to increase enrollment might be to broadcast online a Test Prep class being held at ELAC with live students, allowing remote students as well as those in the classroom to ask questions. This would let ELAC offer the Test Prep classes both locally and across the state, country or world. That option assumes that ELAC is set up technologically and administratively to offer online instruction.

- 16.8. Students in both classes do intend to take the FS or the PS/LS exams, depending on the class, but usually not for one to six or more months. In order to provide valid outcome evidence that the ELAC Test Prep classes prepared students for the tests better than no preparation or other preparation approaches, the students would need to be tracked for six months to several years and the results of their test taking determined. Those results could then be compared to statewide or national results to see if those who took the ELAC Test Prep classes passed in greater proportions than others. The evaluator recommends setting up such a tracking system although results may be few or hard to determine during the two years remaining under the NSF ATE grant. Implementing and following through with such a tracking system, analysis and discussion of results by faculty could help with accreditation of the Land Surveying program or the ELAC Engineering and Technology department.
- 16.9. The evaluation survey had several typographic errors and terminology (especially in regards to the more advanced afternoon test preparation class) that may have confused students or biased survey results. The evaluator, NSF ATE grant coordinator and class instructor need to clarify and consistently use the terminology and abbreviations used to refer to the three tests. In this report the evaluator has adopted the abbreviations found on the NCEES website (<https://ncees.org/surveying>) of “FS” for the first land surveyor test, PS for the national Professional Surveyor test, and LS for the California specific Land Surveyor test. However, the survey itself used “LS” to refer to the national test. While it appears to have generally worked to provide information, the evaluation survey for the course needs to be improved before being used to evaluate future Test Prep classes. While the online format appears to be adequate for the survey delivery, the instructor needs to remember to ask students in both classes to complete the survey, preferably as soon as the class ends. It will only be possible to improve analysis of survey results, including possible statistical analyses, if there are more students in each class who take the survey.

## APPENDIX A. ELAC Test Prep Courses Survey 2019

## ELAC Test Prep Courses Survey 2019

### Introduction

Thank you for taking an East Los Angeles College (ELAC) test preparation course for either the Fundamentals of Surveying (FS) test needed to become a Land Surveyor-in-Training or the national Land Surveyor (LS) and California Specific Land Surveyor examinations required for licensing in California as a Professional Land Surveyor.

These ELAC test preparation courses are partially funded by a National Science Foundation (NSF) grant awarded to ELAC in order to increase the number of licensed professional land surveyors. The grant is being evaluated and this post-course survey is part of that evaluation. Your participation in this survey is voluntary but analysis of its results will help us improve the course for future students and report about the grant to NSF.

## ELAC Test Prep Courses Survey 2019

### Permission to take survey

**You may refuse to take the survey at all, stop taking it part way through, or not answer specific questions without affecting a grade or ability to take the examination for which you are prepping. All that we ask is that you respond in the survey as honestly, frankly, and completely as possible. Thank you for taking the ELAC test preparation course.**

**Note: If you took both course preparation classes today please answer this survey regarding the course you took most recently. You are requested to answer the survey twice, once about the morning course, and once about the afternoon course.**

\* 1. I have read the Introuction and survey taking options and voluntarily agree to take this survey

- ☐ Yes (Selecting this response will take you to the rest of the survey)
- ☐ No (Selecting this response will take you to the end of the survey)

## ELAC Test Prep Courses Survey 2019

### Questions for Both Courses

\* 2. What is your gender?

- ☐ Female
- ☐ Male
- ☐ Other
- ☐ Prefer not to answer

\* 3. With which of the following ethnic/"racial" groups do you identify yourself (check all that apply)?

- ☐ White or Caucasian
- ☐ Black or African American
- ☐ Hispanic or Latino/a
- ☐ Asian or Asian American
- ☐ American Indian or Alaska Native
- ☐ Native Hawaiian or other Pacific Islander
- ☐ Other (please specify)

\* 4. How old are you today (please select your age range)

5. Have you previously attempted the following certification examinations? (please give one answer for each examination)

	Yes, and passed	Yes, but didn't pass	No, eligible but not attempted	No, I'm not eligible
Fundamentals of Surveying (FS) examination	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
National Land Surveying (LS) examination	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
California State Specific Land Surveyor examination	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



6. Instead of this course format, would you have preferred:

	Yes	Maybe	No
A lecture/discussion format	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lecture/discussion followed by a sample test	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
More time for the course, but in one day	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A two-day course	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A course held on a different day of the week	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A course starting at a different time of the day	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
An online course on a specific day and time with a live instructor (like a live webinar)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A pre-recorded online course without a live instructor, available anytime (like a video)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\* 7. The answer to this questions will take you to a section with additional questions concerning the specific course you just took. To which test preparation course will the rest of the responses to this survey apply?

- ☐ Fundamentals of Surveying (FS) test prep (morning course)
- ☐ National Land Surveyor (LS) and California State-Specific Land Surveyor Examination prep (afternoon course)

## ELAC Test Prep Courses Survey 2019

### Fundamentals of Surveying (FS) Test Prep Questions

The questions in this section only apply to those who took the morning test prep course. This course was designed to help you pass the Fundamentals of Surveying (FS) test. You must pass the FS test and take some other actions in order to become a certified Land Surveyor-in-Training.

8. Please rate the quality of the Fundamentals of Surveying (FS) test preparation course on the following:

	Very Good	Good	Fair	Poor	Very Poor
Overall course	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructional style	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information about areas exam covers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information about types of questions to expect	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ease of test questions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Challenge of test questions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Room comfort	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Room temperature	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Please comment about the morning test preparation course.

Best thing about the course

Worst thing about the course

Okay but could have been better

What I struggled with

What wasn't clear

Where I need more review

10. Have you already completed (please respond to each row):

	Yes	No
A high school diploma or GED	<input type="radio"/>	<input type="radio"/>
An Associate degree in a STEM field	<input type="radio"/>	<input type="radio"/>
An Associate degree in a non-STEM field	<input type="radio"/>	<input type="radio"/>
A bachelor's degree in a STEM field	<input type="radio"/>	<input type="radio"/>
A bachelor's degree in a non-STEM field	<input type="radio"/>	<input type="radio"/>
Two years of postsecondary (college-level) land surveying education	<input type="radio"/>	<input type="radio"/>
Two or more years of land surveying related work experience	<input type="radio"/>	<input type="radio"/>
A combination of postsecondary (college level) land surveying education and land surveying related work experience totaling two years	<input type="radio"/>	<input type="radio"/>

\* 11. When do you expect to take the FS examination in the future? (Check all that apply)

- ☐ In the next month or earlier
- ☐ in more than one to six months from now
- ☐ in over six to 11 months from now
- ☐ A year or more from now
- ☐ The next time it is offered
- ☐ When I have enough money to afford the fee
- ☐ I'm not sure
- ☐ I don't intend to take the LS test

## ELAC Test Prep Courses Survey 2019

### National Land Surveyor (LS) and California State Specific Land Surveyor Questions

The questions in this section only apply to those who took the afternoon test prep course in order to prepare themselves for the national Land Surveyor and the California State Specific Land Surveyor examinations that they must pass in order to become licensed to practice in California as a Professional Land Surveyor. If you reach this page and did NOT take this course today, please click "done" to exit the survey. Otherwise, please answer the following questions concerning the afternoon course only.

12. Please rate the overall quality of the national Land Surveyor (LS) test preparation and the California specific test preparation (give one response for each row)

	Very Good	Good	Fair	Poor	Very Poor
National Land Surveyor examination preparation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
California State Specific Land Surveyor examination preparation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Please comment about the afternoon test preparation course.

Best thing about the course

Worst thing about the course

Okay but could have been better

What I struggled with

What wasn't clear

14. Please rate the quality of the **national Land Surveyor (LS) test preparation** on the following:

	Very Good	Good	Fair	Poor	Very Poor
Instructor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructional style	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information about areas exam covers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information about types of questions to expect	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ease of answering practice test questions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Challenge of practice test questions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clarity of practice test questions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. Please rate the quality of the **California specific test preparation** on the following:

	Very Good	Good	Fair	Poor	Very Poor
Instructor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructional style	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information about areas exam covers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information about types of questions to expect	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ease of answering practice test questions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Challenge of practice test questions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clarity of practice test questions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. Please explain the reasons for your ratings in the last two questions.

17. **Before** you took the LS course preparation course, in which of the following examination areas did you feel that you needed review? (Check all that apply)

- ☐ Mathematics of land surveying
- ☐ Regulations and statutes
- ☐ Work processes of land surveying
- ☐ Client relations during land surveying
- ☐ Ethics of land surveying situations
- ☐ Professional land surveying behavior
- ☐ California state specifics
- ☐ All of the above
- ☐ None of the above

18. **After taking** this LS/California specific examinations preparation course, in which of the following examination areas did you feel that you need to review more before taking the certification exam itself? (Check all that apply)

- ☐ Mathematics of land surveying
- ☐ Regulations and statutes
- ☐ Work processes of land surveying
- ☐ Client relations during land surveying
- ☐ Ethics of land surveying situations
- ☐ Professional land surveying behavior
- ☐ California state specifics
- ☐ All of the above
- ☐ None of the above

19. Compared to how confident you were about the following, how much did taking the course improve your confidence in being able to pass the following parts of the licensing examinations:

	A great deal	A fair amount	Somewhat	Not very much	Not at all
Mathematics of land surveying	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regulations and statutes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Work processes of land surveying	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Client relations during land surveying	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Analyzing ethics of situations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professional land surveying behavior	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
California specific land surveyor test	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. Have you already done the following (please check one answer per row)

	Yes	No	Not Applicable
High School Diploma or GED	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bachelor's degree in a STEM field	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bachelor's degree in a non-STEM field	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Obtained Land Surveyor-in-Training certification	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Obtained a waiver for the FS examination	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Passed the national Land Surveyor exam in another state	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Become a licensed Civil Engineer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. Have you graduated from a program in land surveying with a four-year Board-approved curriculum?

- ☐ Yes
- ☐ No
- ☐ Don't Know (please explain)

**22. NOT INCLUDING ANY YEARS SPENT STUDYING LAND SURVEYING IN A CURRICULUM PROGRAM**, how many years of FULL-TIME experience have you had in land surveying to date?

	One year	Two years	Three years	Four years	Five years	Six or more years
in doing land surveying	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
in a position responsible for field training	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
in a position responsible for office training	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**23. When do you expect to take the LS examination and/or the California Specific exam in the future?**  
(Check all that apply)

	national LS test	California specific test
In the next month or earlier	<input type="checkbox"/>	<input type="checkbox"/>
in more than one to six months from now	<input type="checkbox"/>	<input type="checkbox"/>
in over six to 11 months from now	<input type="checkbox"/>	<input type="checkbox"/>
A year or more from now	<input type="checkbox"/>	<input type="checkbox"/>
The next time it is offered	<input type="checkbox"/>	<input type="checkbox"/>
When I have enough money to afford the fee	<input type="checkbox"/>	<input type="checkbox"/>
I'm not sure	<input type="checkbox"/>	<input type="checkbox"/>
I don't intend to take the LS test	<input type="checkbox"/>	<input type="checkbox"/>
I don't intend to take the California Specific test	<input type="checkbox"/>	<input type="checkbox"/>



## ELAC Test Prep Courses Survey 2019

End of Survey

**Thank you for your responses!! Click "Done" to exit this page.**