



Engineering Surveying Course Taught to Civil Engineering Students in KSA Universities: A Case Study of Albaha University

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ABSTRACT

Surveying course is one of the fundamental subjects that involved in academic plan of most civil engineering programs. It generally covers topic that concerned with mapping, setting out, earthwork, and design. The course title differs from one program to another. It may appear under the name of surveying, mapping techniques or geomatic. Surveying is applicable in almost all branches of civil engineering whether structure, highways or hydraulic engineering.

In surveying courses, some educational problems may face both students and lecturers because of the nature of the subject that consists of practical side and field work applications; and communication complicity of knowledge transfer between the two the sides. In addition to student society in which the course presented.

This research work tried to study analyze and evaluate examination results of surveying course taught to civil engineering student in the Kingdom of Saudi Arabia (KSA) taking faculty of engineering in Albaha university as a case study.

Both courses; surveying 1 and surveying 2 were taken into consideration. Results showed that a great chance is available for students to pass the course and only about 7% of students are expected to fail the course.

About 19% of student can successfully have grades A to A+ where, grades D to D+ represent the dominant grades. Beside that the general trend line of course results tend to be normally distributed.

Moreover, analysis showed that both subject results of surveying 1 and surveying 2 were highly correlated.

Keyword: *Academic plan, Albaha University, Correlation, Examination criteria, GIS, GPS, Surveying 1, Surveying 2.*

I. INTRODUCTION

Extensional revolution in university education in Kingdom of Saudi Arabia (KSA) depended largely on foreign teaching staff whereas, recently, the national staff appeared to put their own finger print in universities teaching track.

Foreign teaching staffs always comment on lowly academic level of students but, no one make scientific study to proof that. Knowing that, the general trend of academic level of students goes globally in decreasing manner because of ease of modern technology usage as some of them justified.

There has been a significant decline of surveying education in civil engineering programs across the nation. Based on a study by Gillins, Olsen, and Schultz (2016), which evaluated 239 accredited bachelor's programs in civil engineering in the United States, 35.5% of the bachelor's programs in civil engineering do not require students to take any courses in surveying. This study also found 27.6% of those civil engineering programs do not even list surveying as an elective for civil engineering students. In addition, it was stated that the average number of required semester credits in surveying required within civil engineering curricula in the United States has significantly decreased^[7].

Nature of surveying subject in an undergraduate civil engineering curriculum needs a substantial amount of hands-on training to obtain adequate learning outcomes. A lecture-only mode of delivery does not

provide the adequate surveying skills needed by an engineering student. In 2009, workshops were introduced for the Civil Engineering Drawing and Surveying unit at Curtin University, Australia, with the aim of offering students hands-on training in surveying to enhance their learning. That study results indicate that students were satisfied with the workshops and recognized/perceived them to contribute to the development of the learning attributes they need to acquire^[8].

II. EDUCATION IN KSA

Governmental education in Kingdom of Saudi Arabia (KSA) started by establishment of the directorate of knowledge in 1925 marked the launch of the first regular educational system in the KSA and was the bench mark of the boys' educational System in the country.

The first Council for knowledge was established in 1927 with an aim to develop an educational system that would monitor education in the Hijaz Region.

In 1951, the ministry of knowledge was established in the reign of King Saud Bin Abdul Aziz. It was the expanded and developed form of the directorate of knowledge. Its functions were to plan, and monitor boys' government education in primary, preparatory, and secondary schools. King Fahd Bin Abdul Aziz was the first minister of knowledge.

In 1960 the general presidency for girls' education, was established the reign of king Faisal Bin Abdul Aziz. The presidency was responsible for 15 primary schools and one female teachers' intermediate institute.

As education evolved, a royal decree was issued in 2002 to annex the general presidency for girls' education, under the ministry of knowledge. Then ministry of knowledge, was renamed the ministry of education in 2003.

The ministry of higher education was established in 1975 to execute the Kingdom's policy on higher education. The minister of education is responsible for the implementation of the government's educational policy.

Higher education has received enormous governmental support; new universities, scientific and applied colleges were established and huge funds

were allocated in budgets for higher education. Now (2018) The number of Higher education institutions in KSA has registered 26 government universities, 10 private universities, and 41 private colleges. These universities and colleges have scientific and applied majors in different areas. The ministry of Higher Education has also adopted modern approaches for scientific research, and future planning.

In 2015, the ministries of education and higher education were merged into one entity, the ministry of education.

III. ALBAHA UNIVERSITY

Albaha University is a university in Albaha city, the capital of Albaha province, Kingdom of Saudi Arabia. It is a governmental university that was established in 2006 with three faculties; Engineering, Science and Applied Medical Sciences. At the present, the main campus of the university located at Alaqiqtown about 25 km away from Albaha city^[4]. The other campuses are in Almikhwah, Almandaq, and Baljurashiprovinces. The main campus in Alaqiq occupies about 6.7 km² including seven colleges of the university. The university emphasizes public services in all of its disciplines. The university consists of 11 faculties:

1. The faculty of Medicine
2. The faculty of Engineering
3. The faculty of Applied Medical Sciences
4. The faculty of Administrative and Financial Sciences
5. The faculty of Science
6. The faculty of Education
7. The faculty of Arts and Humanities
8. College of Science and Arts in Almikhwah
9. College of Science and Arts in Almandaq
10. College of Science and Arts in Baljurashi
11. Community College

In the past, faculty of engineering was belonging to Umalqora University then, it was independent in 2006 with the establishment of Albaha University to be one of its first founded faculties^[3].

The faculty was started with three programs; civil, architecture, and electrical engineering. Computer engineering program was added as the fourth program in 2011.

The faculty include now about 1500 students coming from different regions of the country.

IV. COURSE DESCRIPTION AND EXAMINATION CRITERIA

Academic plan 2010 (1432 Hijri) of civil engineering program described Surveying 1(32011303)to introduce students to surveying, tapping, levelling and traversing through teaching students the basic concept of surveying and its applications in tapping, levelling and coordinates calculation. Engineering mathematic was conditioned to be a prerequisite course for surveying 1.

On the other hand the same academic plan stated the objectives of Surveying 2(32011304) course is to teach students the basic principles of engineering surveying, principles of GPS and photogrammetric. The course description includes horizontal and vertical curves, methods of setting out, area and volume computation, introduction to GPS and photogrammetry. The prerequisite course of surveying 2, was surveying 1, where, surveying 2 itself represent a prerequisite course for both Geographic Information System (GIS) applications and Global Positioning System (GPS) Applications^[1].

Both courses evaluation divided into two main components; course work and final exam. Course work have 60% weight including attendance, laboratory, mid-semester exam, quizzes, exercises and homework's. Where, the remaining 40% left for the final exam. By this evaluation, great chance for the student to pass the course and have advance grades.

Examiner used to prepare quizzes and examinations that proportional to students capabilities taking into account the mathematical background and secondary school educational level that students came from. Although these examinations were not so difficult, they were also not simple as well and students success to gain good marks.

Types of examination questions used were of the following types:

- Direct computational questions that require students to perform calculations in order to solve for an answer.
- Short answer questions which composed of a brief prompt that demands a written answer of few sentences testing the basic knowledge of key facts and terms of the syllabus.
- Multiple choice questions composed of one question with multiple possible answers, including the correct answer.

- Matching questions that sometimes appeared as table or fill-in-the-blank.
- True/false questions that only composed of a statement. Students respond to the questions by indicating whether the statement is true or false. Although this types of question were used to be given but, some student fail to answer correctly.

V. DATA AND ANALYSIS

According to exam regulations in Albaha university, the evaluation of each student in a particular course subjected to the following graduation table:

Table 1: University exam grading system.

Grade	Marks	Code	Points
Exceptional	95-100	A+	4.00
Excellent	90-94	A	3.75
Superior	85-89	B+	3.50
Very good	80-84	B	3.00
Above average	75-79	C+	2.5
Good	70-74	C	2.00
High pass	65-69	D+	1.5
Pass	60-64	D	1.00
Fail	Less than 60	F	0.00
In-progress	-	IP	-

To simplify and summarize analysis for this study, five graduation categories were suggested. These graduations are; A, B, C, D and F. Where, A included A to A⁺ and soon according to the following table.

Table 2: Summarized graduation system.

Exam code	Summarized code
A to A ⁺	A
B to B ⁺	B
C to C ⁺	C
D to D ⁺	D
F	F

Data for this research work was extracted from university examination records during the period of study through academic years 2015 up to 2018.

Registered students for both subjects surveying 1 and surveying 2 were found to be as arranged in table (3) below.

Table 3: Registered students for surveying.

Academic Year	Registered student	
	Surveying 1	Surveying 2
2015/2016	66	48
2016/2017	46	49
2017/2018	56	61

Final results of student evaluation for surveying 1 during the study period were extracted. Percentages were calculated for each grade. Then, Average percentage grades were calculated for the three academic years as shown in table (4) hereunder.

Table 4: Results of surveying 1.

Academic year	Percentage grade				
	A	B	C	D	F
2015/2016	23	23	15	27	12
2016/2017	11	20	24	36	9
2017/2018	15	26	31	25	3
Average	16	23	23	30	8

Figure (1) below illustrates the average grade of student results of surveying 1.

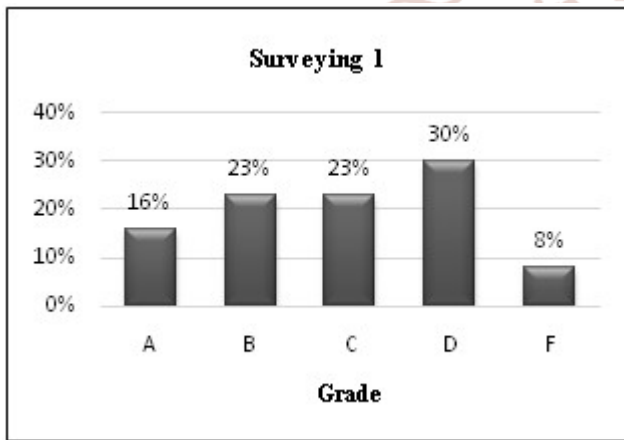


Fig 1: Average grades in surveying 1

It can be noted that 92% of students success to pass the subject and 16% of them had grade A. in opposite, grade D appeared as the highest grade.

Student's results in surveying 2 were also collected and arranged similarly as presented in table (5). Again average grades were calculated.

Table5: Results of surveying 2.

Academic year	Percentage grades				
	A	B	C	D	F
2015/2016	21	22	25	25	7
2016/2017	12	25	22	39	2
2017/2018	30	30	23	10	7
Average	21	26	23	25	5

For the three academic years of study period, the average of each grade plotted in bar graph as illustrated in figure (2) below.

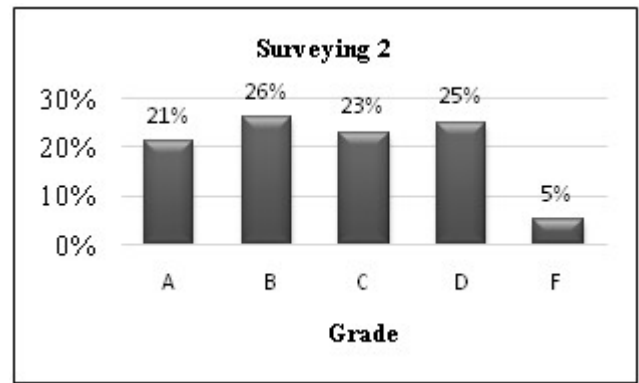


Fig 2: Average grades in surveying 2

From the figure it could be noted that student's achievement in surveying 2 was improved compared with surveying1. Though, 95% of students success to pass the subject and 21% of them had grade A.

Again, grade D was the highest grade with 25% of the total number of students.

Correlation between average grade of both surveying 1 and surveying 2 can be calculated as 0.9 that means the two subjects are highly correlated.

Average grade for both surveying 1 and surveying 2 can be reduced as a final result as presented in table (6) hereunder.

Table 6: Final results.

Grade	A	B	C	D	F
Average	18.5	24.5	23	27.5	6.5

Again, the final result can be shown in a bar graph as illustrated in figure (3).

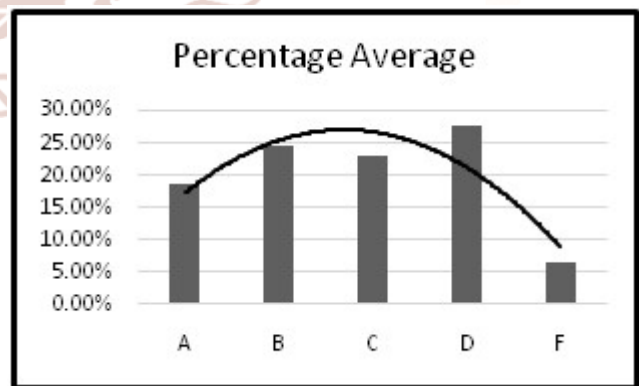


Fig 3: Final results.

From figure (3), the trend line generally tend to be normally distributed where, about 97% of students has a chance to pass. Also, grade D represent the highest percentage grade as noted before.

VI. CONCLUSION

In this research work, Albaha university was taken as a sample case in Kingdom of Saudi Arabia universities to study, analyze and evaluate examination results of surveying course taught to civil engineering students.

Student results in both surveying courses; surveying 1 and surveying 2 were taken into consideration. Data was collected and analyzed for three academic years. Results of the research study can be concluded in the following points:

- According to examination rules, course work evaluation gives good chance for students to assess themselves before the final exam.
- A great chance is available for students to pass surveying subjects.
- A chance available for about 19% of students to have grade A or better.
- Grades D and D⁺ are the dominant grades.
- In general, students improve their achievement in the second course of surveying compared with the first one.
- Results of the two subjects; surveying 1 and surveying 2 were found to be highly correlated and go hand by hand with each other.

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