

Final Report of Questionnaire Survey among geodesy Students and Stakeholders

Summary

Three Universities in Jordan; Al-Balqa Applied University, The Hashemite University and Yarmouk University created a survey to determine the concerns and needs for new three master programs in Geodesy and geoinformatics. The survey, which focused on various aspects of graduate students needs was distributed to students, graduates and stakeholder from the area of geoinformatics and Geomatics inside Jordan and the nearby. This report describes methods used to create and distribute the surveys, an overview of responses and implications for graduate programs. The survey showed an interest from students from different backgrounds to start master program in Geodesy and Geoinformatics in Jordan, with high need for modernizing the teaching methods and the contents of the programs they are studying or already studied, in addition to upgrading and modernizing Computer facility and geodetic equipment's.

November 2018

1. Introduction

Spatial resource management in Jordan had been recognized as very important by many decision makers, and as a result attempts have been made to incorporate necessary infrastructure in work places. The modern technology and its tools namely GIS, GPS and Remote Sensing are widely used for planning and management of cities, land use, planning and management of utilities and resources, multipurpose cadaster and for decision making with respect to the management of many other resource management systems. In most of the developing countries the spatial databases and related information systems have been in place and the associated technologies have been set in place.

Geodesy and geoinformatics blends the knowledge of science and engineering with information technologies to solve complex, real-world problems. The diverse issues tackled by the field range from tracking a vehicle's location within a city to determining land use from a satellite image. It focusses on the science and technologies related to positioning and navigation, sensors, measurements and mapping, as well as on spatial awareness and intelligence.

Six universities are involved in the project "Geodesy and Geoinformatics for Sustainable Development in Jordan (GEO4D)", which is funded by the Erasmus+ Program of the European Union. The project partners are: Al-Balqa Applied University, The Hashemite University, Yarmouk University, Polytechnic University of Milano (Italy), University of Leon-Ponferrada (Spain), and the Royal Institute of Technology (Sweden), the latter partner is the project leader. There are two other non- academic partners in the project:

The Ministry of Higher Education and Scientific Research and Modern Survey Office (MSO), Amman, Jordan and the modern office for survey in Amman.

The main objective of the GEO4D project is to develop three new master programs as follows:

- 1) MSc in Geomatics at Al-Balqa Applied University
- 2) MSc in Geoinformatics at The Hashemite University
- 3) MSc in Applied Geoinformatics at Yarmouk University

For this purpose, a survey was conducted among students and employers in the fields of geodesy, geomatics, geography, geology, engineering, environmental sciences or other relevant disciplines. Its purpose is to establish key learning outcomes and requirements in the design and

delivery of the program. The needs relate to the characteristics, concerns and potential constraints of the students or relevant stakeholders. The analysis seeks to match possible or proposed techniques and materials to these needs and thus identify whether the design is appropriate to the intended goals. The survey questioner is found in annex 1 and 2.

2. Materials and Methods

A. Students' Survey

The questionnaire was designed to capture data through Web-based Survey, it was designed and distributed to students inside and outside Jordan from different specializations (study subjects), levels and age groups. A total number of 1962 response were collected, only 1179 responses were included in the analysis. The excluded questionnaires were incomplete and has no reasonable answers. Figure 1 shows the responses of survey participants by gender classification. 58% of males and 42% of females, which reflect close proportions of participation.

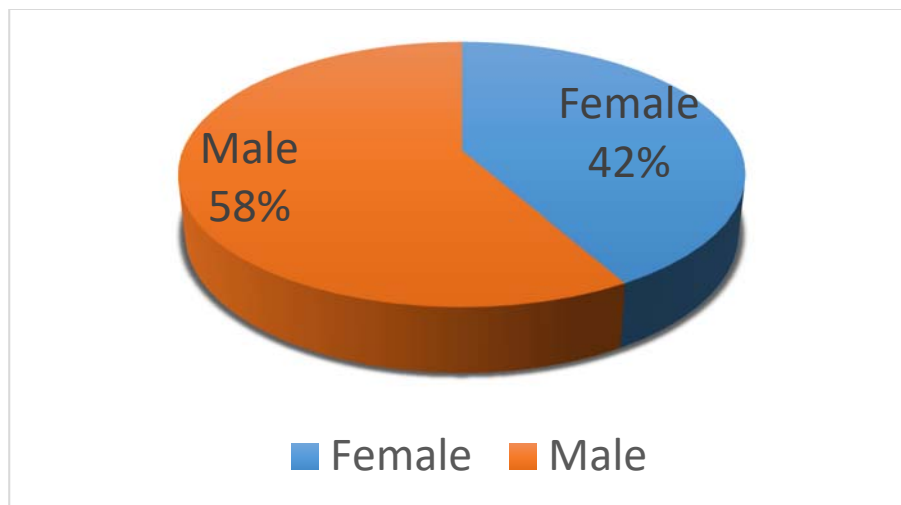


Figure 1. Gender Classification of participants in the Survey.

Data captured through the questionnaire were tabulated and then were ranked using a qualitative classification having five class groups identified as Very High (strongly agree), High (Agree), Medium (Neither agree nor disagree), low (disagree) and very Low (strongly disagree). Each class was then assigned a numerical value as 5, 4, 3, 2, and 1, respectively.

Most of the responses were received from students in the age group of 22-25 years which represented 48.44% of the total number of responses as shown in Table 1.

Table 1. Distribution of responses on the age groups

Age Group	< 22 years	22-25	25-30	> 30
No of Responses	219	571	195	194
Percentage	18.57%	48.43%	16.53%	16.45%

Most of the interest in perusing higher studies were coming from Bachelor degree holders with a percentage of 50.68 %, followed by currently enrolled Bachelor degree students with 39.32% (Table 2).

Table 2. Distribution of responses according to the highest level of education

Level of Education	No. of responses	Percentage
Bachelor student	464	39.32%
Bachelor degree	598	50.68%
Master degree	81	6.89%
Other	36	3.11%

It was important to identify the respondent's subjects of study as we are going to start three new master programs in 3 different universities. Responses were mainly coming from Surveying and Geomatics engineering students with a percentage of 44.65% followed by Civil Engineering students and then by Geography and Geology students as shown in Table 3.

Table 3. Classification of participants according to their academic background.

No.	Major/study subject	No. of responses	Percentage
1	Surveying and Geomatics Engineering	526	44.65%
2	Civil Engineering	250	21.24%
3	Geography	219	18.54%
4	Geology	110	9.34%
5	Others	73	6.22%

Around 6.22% of the respondents from other Subjects of Study were also interested in the proposed master programs including: Computer Engineering, Geophysics, Environmental Sciences, Urban Planning and Information Technology.

Actually the majority of the responses were coming from students and full time employed people, and this is strongly connected with the next paragraph of the questionnaire as most of the participants interested in the master programs for the purpose of advancement in their current career or as an entry certificate for a new career (Tables 4 and 5).

Table 4. Classification of participants according to current employment status.

No	Employment status	Percent responses	Total responses
1	Employed full time	33.37%	417
2	Employed part time	9.89%	118
3	Not employed	20.6%	243
4	Student	34.15%	402

Table 5. Classification of participants reasoning for entering a new master program

No	Reason	Percent responses	Total responses
1	Entry into new career	37.82%	446
2	Advancement in current career	39.52%	466
3	Career change	22.64%	267

It is important to find out the need for such master programs for Jordan and for the neighboring countries. About 89.58% of the respondents were from Jordan, while 10.42% responses were from neighboring countries (Table 6). Although the little responses from students outside Jordan, it is a good indicator for the potential success of the programs on a regional scale.

Table 6. Country of origin for questionnaire respondents,

No	Country of Residence	Number of participants
1	Saudi Arabia	66
2	Oman	16
3	Bahrain	19
4	Palestine	8
5	Kuwait	7
6	UAE	7

Classification separating the answers of graduates/students from BAU, HU and YU, in order to identify the interests in different proposed MSc programs.

Table 7. Responses from Geomatics Students

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am satisfied with my study program	7.9%	22.2%	10.8%	49.5%	9.6%
I think the contents of the program should be modernized	1.3%	4.5%	8.6%	44.8%	40.8%
The teaching methods should be modernized	1.3%	2.8%	3.6%	41.7%	50.6%
The computer facility and geodetic equipment should be modernized	1.4%	2.0%	4.2%	31.0%	61.4%
I am interested to learn more on GNSS (GPS) and other new technologies	0.5%	2.6%	4.7%	41.3%	50.9%
I am interested to learn more on photogrammetry, remote sensing and digital image processing	2.1%	4.4%	7.8%	34.6%	51.1%
I am interested to learn more on Geographic Information Systems (GIS)	2.1%	3.8%	7.2%	33.7%	53.2%

I am interested to learn more on laser scanning	3.6%	2.3%	7.3%	34.2%	52.6%
I wish to get more information on geodesy employment opportunities during my study period	1.7%	3.4%	3.3%	39.0%	52.6%
I am interested to study for a master degree in Geomatics if such a master program is offered	4.1%	5.7%	14.3%	32.5%	43.4%
I am interested to study for a master degree in applied geoinformatics	1.6%	4.1%	12.3%	41.1%	40.9%
I am interested to study for a master degree in geoinformatics for natural resource management if such a master program is offered	5.6%	5.2%	18.5%	39.2%	31.5%
I have certain knowledge about the Bologna process in Europe	12.6%	14.7%	61.9%	3.3%	7.5%
I have certain knowledge about the European Credit Transfer System (ECTS)	9.9%	12.7%	59.7%	12.8%	4.9%
I am interested to participate in the activities of the Erasmus+ project	5.5%	3.8%	20.9%	30.5%	39.3%

Table 8. Responses from Civil Engineering Students

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am satisfied with my study program	8.7%	20.3%	6.8%	51.5%	12.7%
I think the contents of the program should be modernized	3.3%	3.5%	7.7%	40.7%	44.8%
The teaching methods should be modernized	2.3%	1.8%	4.6%	40.7%	50.6%
The computer facility and geodetic equipment should be modernized	2.4%	3.0%	4.2%	30.0%	60.4%
I am interested to learn more on GNSS (GPS) and other new technologies	1.5%	1.6%	4.7%	40.3%	51.9%

I am interested to learn more on photogrammetry, remote sensing and digital image processing	4.9%	2.2%	8.2%	34.6%	50.1%
I am interested to learn more on Geographic Information Systems (GIS)	4.1%	5.8%	6.2%	33.7%	50.2%
I am interested to learn more on laser scanning	2.6%	5.3%	9.3%	32.2%	50.6%
I wish to get more information on geodesy employment opportunities during my study period	2.7%	3.4%	2.3%	40.0%	51.6%
I am interested to study for a master degree in Geomatics if such a master program is offered	3.1%	7.7%	18.3%	30.5%	40.4%
I am interested to study for a master degree in applied geoinformatics	1.6%	6.1%	19.3%	32.1%	40.9%
I am interested to study for a master degree in geoinformatics for natural resource management if such a master program is offered	4.6%	11.2%	12.5%	39.2%	32.5%
I have certain knowledge about the Bologna process in Europe	16.6%	11.7%	60.9%	4.3%	6.5%
I have certain knowledge about the European Credit Transfer System (ECTS)	12.9%	6.7%	62.7%	7.8%	9.9%
I am interested to participate in the activities of the Erasmus+ project	5.5%	7.8%	31.9%	33.5%	21.3%

Table 9. Responses from Geography Students

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am satisfied with my study program	7.9%	21.1%	12.8%	48.5%	9.7%
I think the contents of the program should be modernized	0.3%	4.5%	8.7%	42.8%	43.7%
The teaching methods should be modernized	3.3%	1.8%	3.6%	40.7%	50.6%

The computer facility and geodetic equipment should be modernized	1.4%	2.0%	2.2%	31.0%	63.4%
I am interested to learn more on GNSS (GPS) and other new technologies	2.5%	4.6%	50.9%	36.3%	5.7%
I am interested to learn more on photogrammetry, remote sensing and digital image processing	0.1%	5.4%	50.1%	34.6%	9.8%
I am interested to learn more on Geographic Information Systems (GIS)	0.1%	5.8%	5.2%	36.7%	52.2%
I am interested to learn more on laser scanning	0.4%	3.1%	52.0%	33.2%	11.3%
I wish to get more information on geodesy employment opportunities during my study period	0.7%	4.4%	53.6%	34.0%	7.3%
I am interested to study for a master degree in Geomatics if such a master program is offered	3.1%	43.4%	32.5%	15.3%	5.7%
I am interested to study for a master degree in applied geoinformatics	3.6%	9.1%	10.3%	36.1%	40.9%
I am interested to study for a master degree in geoinformatics for natural resource management if such a master program is offered	1.6%	10.2%	16.5%	40.2%	31.5%
I have certain knowledge about the Bologna process in Europe	11.6%	15.7%	57.9%	7.3%	7.5%
I have certain knowledge about the European Credit Transfer System (ECTS)	7.9%	12.7%	58.7%	12.8%	7.9%
I am interested to participate in the activities of the Erasmus+ project	2.5%	5.8%	39.9%	30.5%	21.3%

Table 10. Responses from Geology Students

	Strongly Disagree	Disagree	Neither Agree nor	Agree	Strongly Agree
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			Disagree		
I am satisfied with my study program	9.9%	26.2%	11.7%	40.5%	11.7%
I think the contents of the program should be modernized	2.3%	3.5%	5.6%	47.8%	40.8%
The teaching methods should be modernized	2.3%	3.8%	2.6%	40.7%	50.6%
The computer facility and geodetic equipment should be modernized	2.4%	4.0%	2.2%	35.0%	56.4%
I am interested to learn more on GNSS (GPS) and other new technologies	1.5%	40.9%	42.3%	8.7%	6.6%
I am interested to learn more on photogrammetry, remote sensing and digital image processing	1.1%	32.6%	50.8%	5.4%	10.1%
I am interested to learn more on Geographic Information Systems (GIS)	1.1%	6.8%	7.2%	34.7%	50.2%
I am interested to learn more on laser scanning	1.4%	40.20%	54.00%	2.3%	2.1%
I wish to get more information on geodesy employment opportunities during my study period	0.7%	7.4%	6.3%	40.0%	45.6%
I am interested to study for a master degree in Geomatics if such a master program is offered	31.50%	41.40%	4.7%	6.1%	16.3%
I am interested to study for a master degree in applied geoinformatics	4.6%	11.1%	10.3%	30.1%	43.9%
I am interested to study for a master degree in geoinformatics for natural resource management if such a master program is offered	1.6%	12.2%	21.5%	43.2%	21.5%
I have certain knowledge about the Bologna process in Europe	8.6%	16.7%	57.9%	9.3%	7.5%
I have certain knowledge about the European Credit Transfer System (ECTS)	10.9%	13.7%	49.7%	14.8%	10.9%
I am interested to participate in the activities of the Erasmus+ project	3.5%	1.8%	40.9%	32.5%	21.3%

Table 11. Responses of students from other subject of studying (computer engineering and Geophysical and Environmental Sciences, Urban planning and information technology)

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am satisfied with my study program	9.9%	20.1%	15.8%	40.5%	13.7%
I think the contents of the program should be modernized	2.3%	6.5%	12.7%	30.7%	47.8%
The teaching methods should be modernized	4.3%	3.8%	3.6%	47.7%	40.6%
The computer facility and geodetic equipment should be modernized	5.4%	5.0%	7.2%	37.0%	45.4%
I am interested to learn more on GNSS (GPS) and other new technologies	3.5%	6.6%	3.7%	44.3%	41.9%
I am interested to learn more on photogrammetry, remote sensing and digital image processing	2.1%	4.4%	8.8%	35.6%	49.1%
I am interested to learn more on Geographic Information Systems (GIS)	2.1%	5.8%	9.2%	35.7%	47.2%
I am interested to learn more on laser scanning	0.4%	1.3%	52.0%	36.2%	10.1%
I wish to get more information on geodesy employment opportunities during my study period	0.7%	10.4%	8.3%	39.6%	41.0%
I am interested to study for a master degree in Geomatics if such a master program is offered	9.1%	6.7%	36.3%	32.5%	15.4%
I am interested to study for a master degree in applied geoinformatics	7.6%	12.1%	13.3%	44.1%	22.9%
I am interested to study for a master degree in geoinformatics for natural resource management if such	2.6%	11.2%	19.5%	35.2%	31.5%

a master program is offered					
I have certain knowledge about the Bologna process in Europe	9.6%	10.7%	61.9%	11.3%	6.5%
I have certain knowledge about the European Credit Transfer System (ECTS)	10.9%	10.7%	60.7%	10.8%	6.9%
I am interested to participate in the activities of the Erasmus+ project	6.5%	4.8%	22.9%	32.5%	33.3%

B. Stakeholders Survey

This survey was conducted by GEO4D team, the questionnaire was distributed by email as well as by personal meetings of a wide range of academics, administrators, employers, institutional leaders. The Main activities of the surveyed organizations are: Surveying Services, Analysis of Electronic Tracking System, GIS Servers Management, Design of Infrastructure Networks, Spatial Studies and Surveying and GPS Applications. The number of employers working in these companies ranged from 4 to 60.

The total number of responses was 139. Most of the responses came from private firms as shown in Table 12.

Table 12. Classification of organization type

Type of organization	Response Total	Response Percent
Local/central government agency	35	25.18
Other public body	7	5.03
Private enterprise	97	69.78

Regarding the type of specialists needed in these firms, it is found that most of them were asking for specialists in GIS, conventional land survey, Geospatial databases and infrastructure, with no

focus on Laser Scanning specialist's, Real Estate economics and Photogrammetry (Table 13). This is because laser scanning is entered the market recently, and photogrammetry works need bureaucratic governmental routines. Other areas of required employment include Ground Penetrating Radar (GPR), GIS development, Lidar Survey and Mobile Mapping System, Tracking Systems, Spatial Decision Support Systems and GIS applications.

Table 13. Type of specialists needed by employers in the Jordanian market.

Type of specialists	Responses	Percentage
Geodesy: geodetic networks and reference systems	50	35.71%
Traditional land surveying	60	42.86%
Engineering surveying	89	64.29%
Global Navigation Satellite System (GNSS)	74	53.57%
Laser scanning	20	14.29%
Land cadaster and land management	40	28.57%
Real estate economics	25	17.86%
Photogrammetry	35	25.00%
Remote sensing	45	32.14%
Geographic information systems (GIS)	109	78.57%
Geospatial databases and infrastructure	74	53.57%
Building Information Modeling (BIM)	50	35.71%
Mapping using drones/ UAV (Unmanned Aerial Vehicle)	40	28.57%
Other	20	14.29%

The last question of this survey was if the organization can receive geodesy students or not? The responses were luckily positive as 60.71 % of the organizations agreed to receive students for visits, and 42.86% willing to receive students for practice (training) with 39.29% of the firms are open to give employment opportunities (Table 14).

Table 14. Availability of organizations to receive students

No.	Availability for receiving students	No. of responses	Percentage
1	Yes, for visits	84	60.71%
2	Yes, for practice	55	39.29%
3	Yes, for employment	60	42.86%
4	No	15	10.71%

3. Conclusions and Recommendations

The present work described a survey for starting a new 3 Geodesy and geoinformatics master programs in Jordan to empower three areas in both the public and private sectors for. A questionnaire was designed and distributed for students and stakeholders including public, private and non-governmental organizations carrying out Geoinformatics applications. The survey showed that 1179 students from inside and outside Jordan are willing to carry on a master studies to enter into new career for an advancement in current career. The survey showed a high need for modernizing the teaching methods and the contents of the programs they are studying or already studied. Upgrading and modernizing Computer facility and geodetic equipment's are one on the concerns that around 50% of the students asking for. 139 responses came from private firms and governmental stakeholders in Jordan and showed their availability to have students for visits with 61%, for employment with 43% and for training with 39%. Most of the stakeholders looking for specialists in the field of GIS, conventional land survey.

There was an interest from the student on Geospatial databases and infrastructure, with no focus on Laser Scanning specialist's, Real Estate economics and Photogrammetry. High interest among the students in continuing their education in geoinformatics/GIS/geomatics -at master's level- and all target groups. There is clear need to improve teaching methods and materials (labs). There is a limited knowledge about ECTS & Bologna process, which requires some actions like seminars to introduce the idea to the students.

Annex 1

Questionnaire Survey among Students



586070-EPP-1-2017-1-SE-EPPKA2-CBHE-JP

Geodesy and geoinformatics for sustainable development in Jordan (GEO4D)

Questionnaire Survey among Students

Yarmouk University, Al-Balqa Applied University and Hashemite University are participating in the GEO4D project on higher education in geodesy and geoinformatics in Jordan. The project is funded by the Erasmus+ Program of the European Union and coordinated by Royal Institute of Technology (KTH) in Sweden.

The main objective of the GEO4 project is to develop new master programs in geodesy and geoinformatics at Jordanian partner universities, based on the interests of students as well as the needs and requirements of the labor market. For this purpose, we are conducting a survey among students in the field of geodesy, geomatics, geography or other relevant subject areas.

You are invited to answer some questions related to geodesy education and geodesy labor market in Jordan. Your opinions will be of great value for curricular development work within the GEO4D project. You can access the complete survey under <http://www.smartsurvey.co.uk/s/KB8B5/> Your answers will be treated confidentially.

If you have any questions on this survey or the GEO4D project, please do not hesitate to contact the local coordinators listed below.

Thank you for your cooperation in advance!

1.
a) Please tell us your gender: <input type="radio"/> Male <input type="radio"/> Female
b) Please tell us your age group:

<input type="radio"/> younger than 22 <input type="radio"/> 22-25 <input type="radio"/> 25-30 <input type="radio"/> Older than 30
c) Please tell us what is your current highest level of education: <input type="radio"/> Bachelor student <input type="radio"/> Bachelor <input type="radio"/> Master <input type="radio"/> Other, specify
d) What subject have you studied / are studying? <input type="radio"/> Geography <input type="radio"/> Geology <input type="radio"/> Engineering <input type="radio"/> Other, specify
e) Which of the following best describes your current employment? <input type="radio"/> Employed full time <input type="radio"/> Employed part time <input type="radio"/> not employed <input type="radio"/> Student
f) What is your country of residence? <input type="radio"/> Jordan <input type="radio"/> Other, please specify
g) If you are interested in a Master's program, what effect on your career do you anticipate? <input type="radio"/> Entry into new career <input type="radio"/> Advancement in current career <input type="radio"/> Career change

2.

In this part kindly report your opinion on the following statements on a 5-point scale as follows:

1 – Strongly disagree • 2 – Disagree • 3 – Neither agree or disagree
 • 4 – Agree • 5 – Strongly agree

• Statement	1	2	3	4	5
1. I am satisfied with my study program					
2. I think the contents of the program should be modernized					
3. The teaching methods should be modernized					
4. The computer facility and geodetic equipment should be modernized					
5. I am interested to learn more on GNSS (GPS) and other new technologies					
6. I am interested to learn more on photogrammetry, remote sensing and digital image processing					
7. I am interested to learn more on Geographic Information Systems (GIS)					
8. I am interested to learn more on laser scanning					
9. I wish to get more information on geodesy employment opportunities during my study period					
10. I am interested to study for a master degree in Geomatics if such a master program is offered					
11. I am interested to study for a master degree in <i>applied geoinformatics</i>					

12. I am interested to study for a master degree in geoinformatics for natural resource management if such a master program is offered					
13. I have certain knowledge about the Bologna process in Europe					
14. I have certain knowledge about the European Credit Transfer System (ECTS)					
15. I am interested to participate in the activities of the Erasmus+ project					

3. Optional question

Are there any aspects that you wish to highlight or clarify or is there additional information that you deem important? Please leave your comment here:

-
-

Thank you for participating in this survey. Your feedback will help us provide quality educational programs.

GEO4D Team



586070-EPP-1-2017-1-SE-EPPKA2-CBHE-JP

Geodesy and geoinformatics for sustainable development in Jordan (GEO4D)

Annex 2. Questionnaire Survey among Stakeholders

1. Name of the organization		
2. Complete address		
3. Contact person Please fill-in the information below, where applicable	Name	
	Position	
	E-mail	
	Office phone	
	Cell phone	
4. Type of organization	a. Local/central government agency	<input type="checkbox"/>
	b. Other public body	<input type="checkbox"/>
	ac. Private enterprise	<input type="checkbox"/>
	d. Other type	<input type="checkbox"/>
5. Number of employers working with geodesy and GIS at your organization		
6. Main activities		
7. Type of specialists which are most needed?	a. Geodesy: geodetic networks and reference systems	<input type="checkbox"/>

	b. Traditional land surveying	<input type="checkbox"/>
	c. Engineering surveying	<input type="checkbox"/>
	d. Global Navigation Satellite System (GNSS)	<input type="checkbox"/>
	e. Laser scanning	<input type="checkbox"/>
	f. Land cadastre and land management	<input type="checkbox"/>
	g. Real estate economics	<input type="checkbox"/>
	h. Photogrammetry	<input type="checkbox"/>
	i. Remote sensing	<input type="checkbox"/>
	j. Geographic information systems (GIS)	<input type="checkbox"/>
	k. Geospatial databases and infrastructure	<input type="checkbox"/>
	l. Building Information Modeling (BIM)	<input type="checkbox"/>

	<p>m. Mapping using drones/ UAV (Unmanned Aerial Vehicle)</p> <p>n. Others. What?.....</p>
<p>8. Can your organization receive geodesy students?</p>	<p>a. Yes, for visits</p>
	<p>b. Yes, for practice</p>
	<p>c. Yes, for employment</p>
	<p>d. No</p>
<p>9. Does your organization need staff re-training in the field of geodesy /GIS/Photogrammetry/ Remote Sensing?</p>	
<p>10. Are there any aspects that you wish to highlight or clarify or is there additional information that you deem important? Please leave your comment here:</p>	<ul style="list-style-type: none"> • • •

Thank you for participating in this survey. Your feedback will help us provide quality educational programs.