



GREAT BASIN COLLEGE LAND SURVEYING AND GEOMATICS BAS PROGRAM REVIEW 2020

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The Land Surveying and Geomatics program (LSG) is committed to addressing the diverse and constantly changing needs of students throughout Nevada and in other locales who are preparing for a geomatics career by improving teaching methods, techniques, and content for delivering high quality educational experiences and achieving student success.

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*Projected

Land Surveying and Geomatics

BAS Program Review Executive Summary 2020

Mission Statement

The mission of Great Basin College (GBC) is to enrich people's lives by providing student-centered, post-secondary education to rural Nevada. Educational, cultural, and related economic needs of the multicounty service area are met through programs of university transfer, applied science and technology, business and industry partnerships, developmental education, community service, and student support services in conjunction with certificates and associate and select baccalaureate degrees.

Program Statement

The Land Surveying and Geomatics program (LSG) is committed to addressing the diverse and constantly changing needs of students throughout Nevada and in other locales who are preparing for a geomatics career by improving teaching methods, techniques, and content for delivering high quality educational experiences and achieving student success.

Program Goals

Goals of Land Surveying and Geomatics program include:

- a) Proficiently apply sound measurement methods, mathematics, science, and surveying tools to collect, analyze, and edit spatial information in professional applications.
- b) Demonstrate competency in the fundamentals and applications of land surveying, and the acquisition and management of spatial data.
- c) Develop a sound background in the humanities, social sciences, and the arts, to function in multicultural and diverse environments.
- d) Provide fundamentals in business management to enable graduates to understand business environments and decision-making processes.
- e) Convey spatial information in graphical, textual, and verbal forms as an individual or as a collaborating member of a professional team.
- f) Prepare to take and pass the Fundamentals of Land Surveying examination developed by the National Council of Examiners for Engineering and Surveying (NCEES).
- g) Enter professional employment in land surveying/geomatics in the state of Nevada, other states, or countries covered by appendix 1603.D.1 of the North American Free Trade Agreement.
- h) Satisfy the educational requirements for licensure required by NRS.625.270 as a professional Land Surveyor in Nevada and recognize the benefit of life-long learning by participating in continuing education as students or as instructors.

Program Objectives

Objectives to assist the Land Surveying and Geomatics program achieve these goals include:

- A) Evaluate and implement appropriate new teaching technologies for delivering high quality educational experiences to our remote students we are:

- i. Continually reviewing and applying new developments in distance education that are relevant to our teaching environment.
- B) Improve and advance the level of our expertise within the disciplines we cover. To achieve this goal, we are;
 - ii. Continually reviewing, learning, and utilizing new techniques in our individual areas of expertise; and
 - iii. Developing new classes or revamping older classes to meet the new industry standards as new technologies become accepted practice.

Program Profile

Currently, the LSG Department has four faculty positions consisting of one full-time faculty member, and three part-time faculty members. The LSG Department also includes administrative staff support that is shared with the Business Department. Please see the faculty biographies at the end of this document for a complete list of qualifications, designations, and interests.

Students Served

According to Great Basin College registration data, Resident and Non-Resident student enrollment totals 125 individuals in Spring 2020.

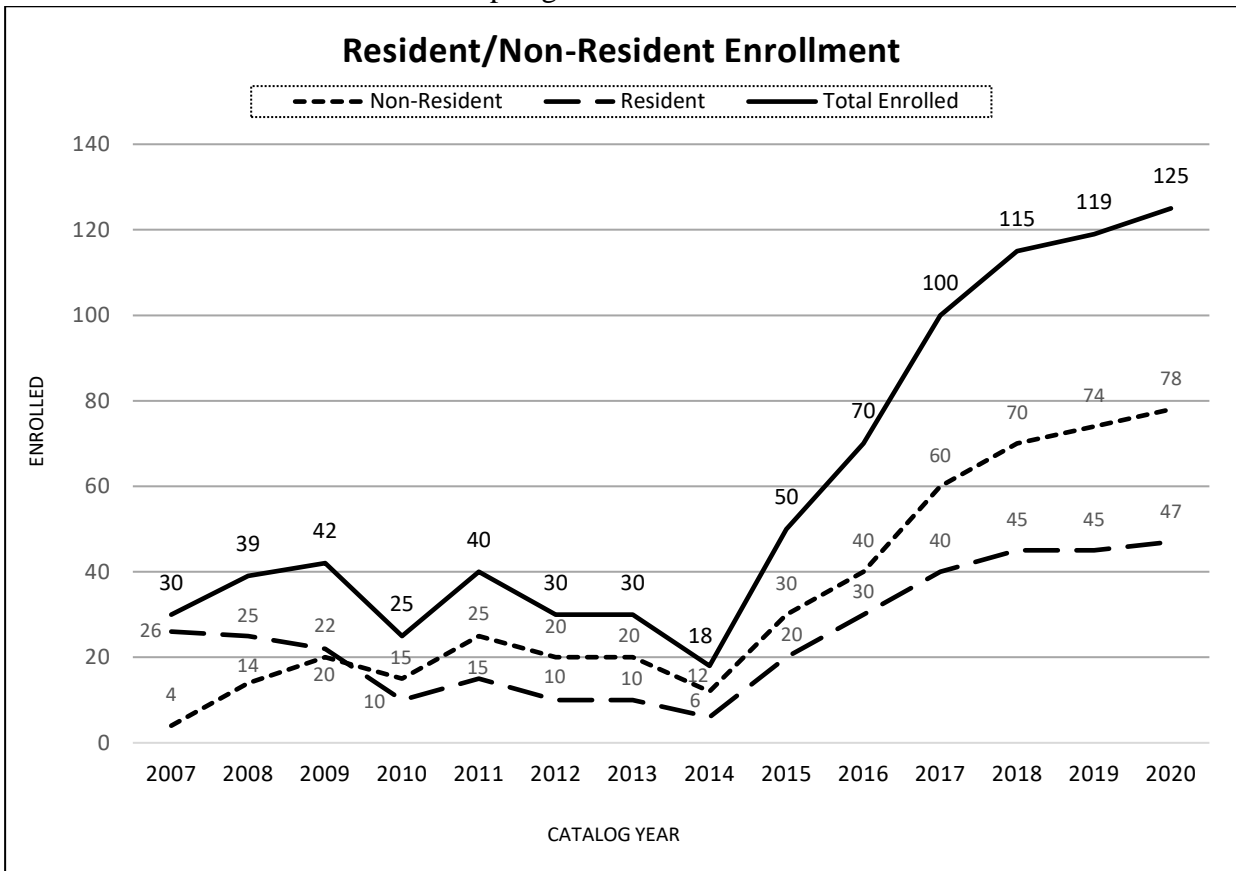


Figure 1. Enrollment of Resident and Non-Resident degree seeking students in land survey courses from 2007-2020. Resident and non-resident student enrollment have steadily increased from catalog year 2014-2015. Currently, 47 students are categorized as having Nevada residency, while 78 students are grouped as non-residents.

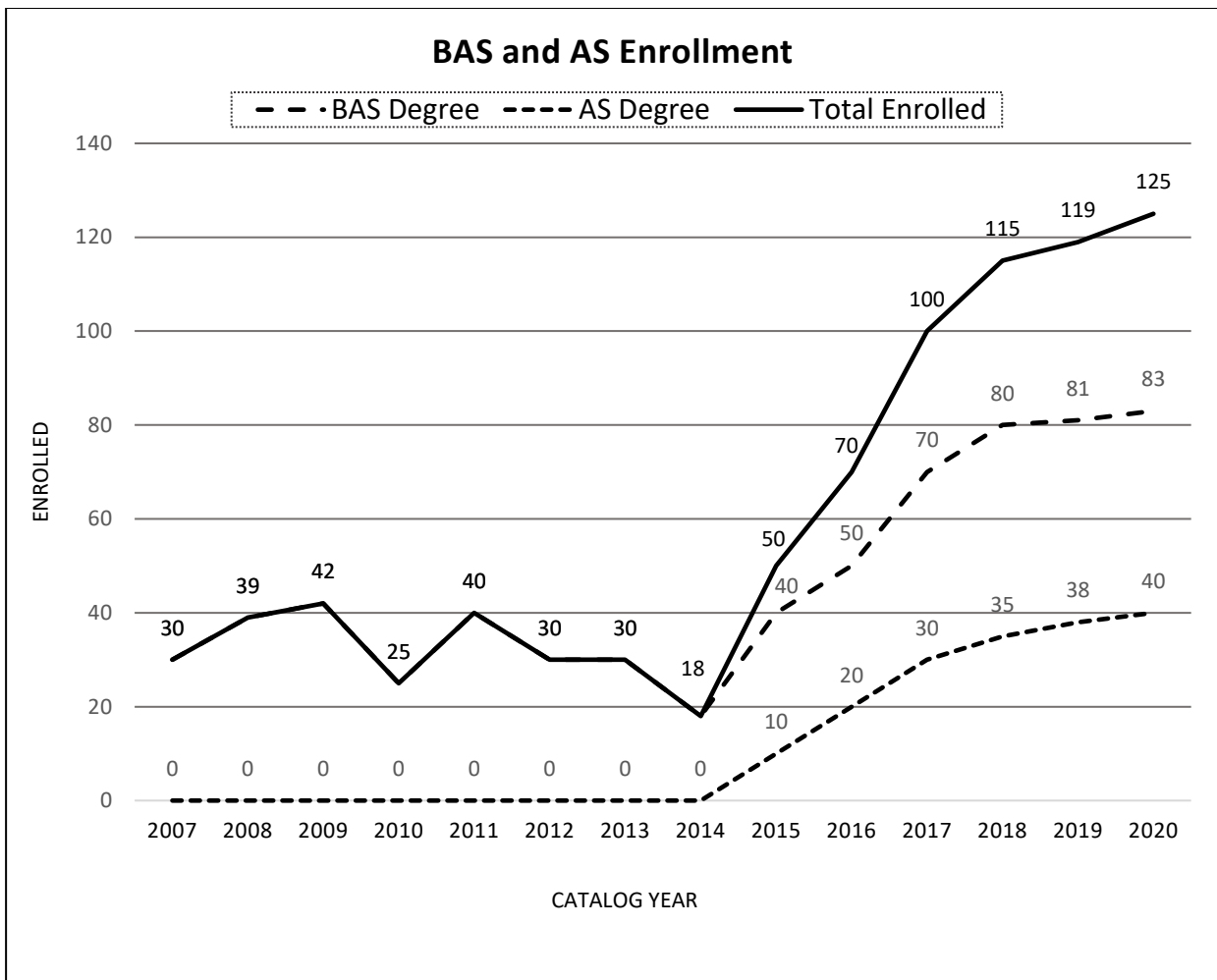


Figure 2. Enrollment of BAS and AS degree seeking students in the LSG program. 83 students have declared the BAS as their major. 40 students have declared the AS as their major. Two students are non-degree seeking. Note: The AS-LSG degree was first cataloged in Fall 2015.

Student Profile

Currently, our student profile related to professional work status can be classified by seven categories:

1. Traditional Student: This group contains those individuals without significant survey experience.
2. GIS: Geographic Information Science professionals who want to pursue licensure.
3. Engineer: Engineering professionals who want to pursue licensure.
4. Survey Tech: This group is comprised of working surveyors who are not licensed and would like to gain licensure.
5. LSIT: This group is comprised of survey technicians who have already passed the (NCEES) Fundamentals of Surveying Examination.
6. LS: This group contains licensed land surveyors.
7. Owner/Partner of Firm: As the owner or principal in a survey or engineering firm (licensure assumed).

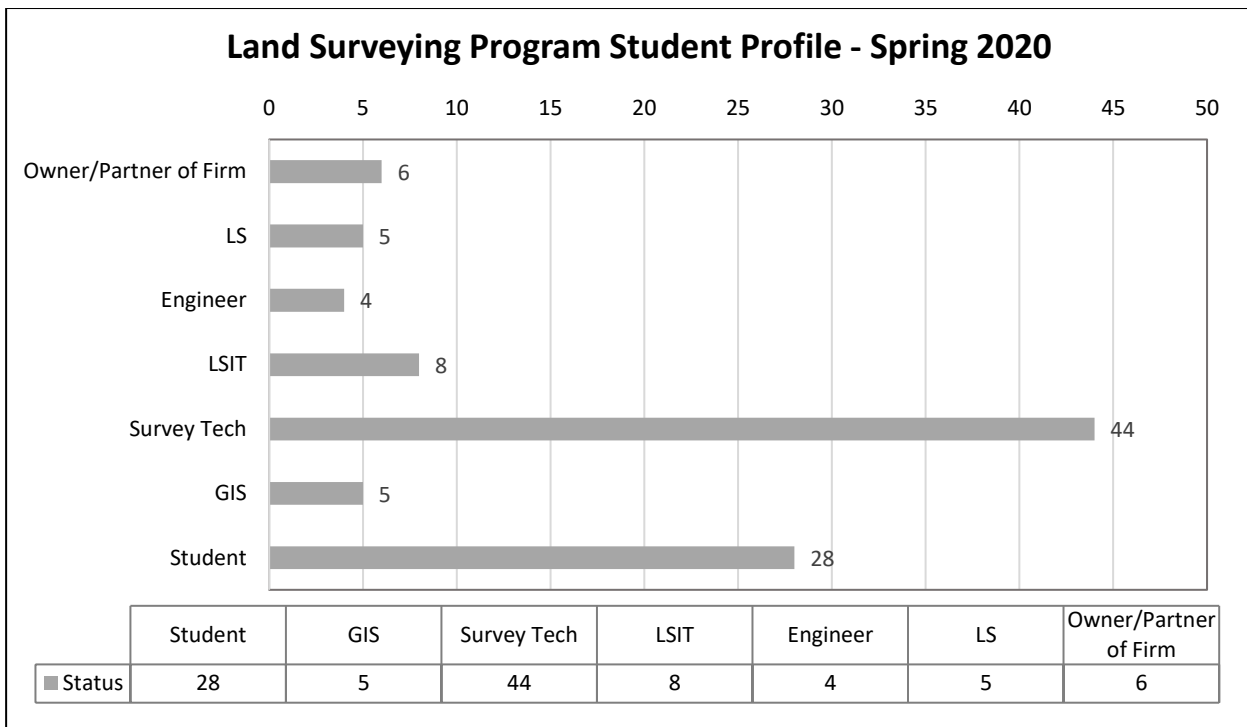


Figure 3. Current Student Profile in relation to Professional Status. *N* = 100 respondents out of 125 contacted.

Survey Technicians (52%) are the largest segment of our student population, which is gained by combining LSIT and Survey Techs. Traditional students represent 37% of the student body and is calculated by combining Student, GIS, and Engineer categories. Adding the Licensed Surveyor and Owner of Firm classifications together, the smallest population (11%) of our program profile is established.

The current student enrollment indicates that 63% of the students have work-related experience in Land Surveying/Geomatics. Certain benefits of work-related experience in the LSG program include:

1. Students demand real-life applications of the concepts to be studied in each course.
2. Students bring real-life survey problems to the course to share and discuss.
3. Students can use their survey experience to analyze and discuss the applicability of survey law and basic concepts.

Conversely, the “traditional” student is disadvantaged by the lack of work experience and must be encouraged to seek relevant survey employment as soon as possible. The ability for the student to properly integrate the coursework into satisfactory learning outcomes is greatly enhanced by survey work experience. To facilitate surveying employment, the LSG program has posted over 100 job announcements from 2015-2019. 24 different employers from both the private and public sector contacted the program looking to fill surveying positions in 2019. Locally, Nevada mining operations from Fire Creek, Turquoise Ridge, Gold Bar, and Phoenix reached out to our LSG students. The program also posted regional job opportunities from private firms and public agencies in Ely, Winnemucca, Reno, Carson City, and Las Vegas. Nationally, federal employers like the BLM, Forest Service, and U.S Army Corps of Engineers sent job postings recruiting our students.

In 2015, traditional students represented only 12% of our student body. The current number of students without significant survey experience has increased 200% and is of great value in the program and to the future of the profession. One strategy our program has undertaken to recruit these traditional students was the development of an Associate of Science degree. The online Land Surveying and Geomatics Associate of Science degree program was designed to matriculate traditional learners, who have limited post-secondary education, directly into a professional degree-seeking program of study. The Associate of Science in Land Surveying and Geomatics prepares the student for entry-level positions in surveying/mapping, civil engineering, resource management, and mining; as well as diverse technical opportunities within federal, state, and local government agencies. In addition to gaining technical employment, the AS degree program provides a seamless pathway into the Bachelor of Applied Science's (BAS) Land Surveying and Geomatics program.

Great Basin's Bachelor degree program in Land Surveying and Geomatics has served Nevada students since its inception in 2005, and distance learners from around the country effectively from 2009. The GBC Land Surveying and Geomatics online program model (our online model was endorsed by the National Society of Professional Surveyors in 2016 to increase surveying student enrollment nationally) is ideally structured for students who are employed (or seeking employment) in a surveying or geospatial related profession that require the flexibility and accessibility to coursework delivered outside the typical undergraduate learning environment. Integrating the existing lower-division prerequisites from the Bachelor of Applied Science Land Surveying and Geomatics degree program along with the general education requirements from the Associate of Science affords learners multiple opportunities to progress in their chosen disciplines. The Associates of Science Land Surveying and Geomatics degree program, along with the Bachelor of Applied Science Land Surveying and Geomatics degree program, provides robust course work and online flexibility that can accommodate the different needs of traditional students, working survey technicians, licensed land surveyors, and state licensure boards.

Currently, the web-based curriculum for the LSG BAS degree delivers complete online instruction in plane land surveying, mapping, GIS for surveyors, least squares adjustment, photogrammetry and remote sensing techniques, the public land survey system, legal descriptions, geodetic and GPS surveying, construction surveying, mine surveying, advanced boundary analysis, and a land surveying/geomatics capstone project. Students engage in various activities using high-precision optical and electromechanical instruments and global positioning data from satellites to collect and analyze spatial data. Specific tools and software packages that are typically used in the instruction include; total stations, levels, satellite imagery, global navigation satellite system (GNSS) data, Carlson Survey, Trimble Business Center, ArcInfo, and Matlab.

Program Graduates

The LSG program has successfully graduated 67 students from 2008 to 2019. It is estimated that Great Basin will confer 13 more BAS and AS degrees in Spring 2020 for a total of 80 LSG graduates.

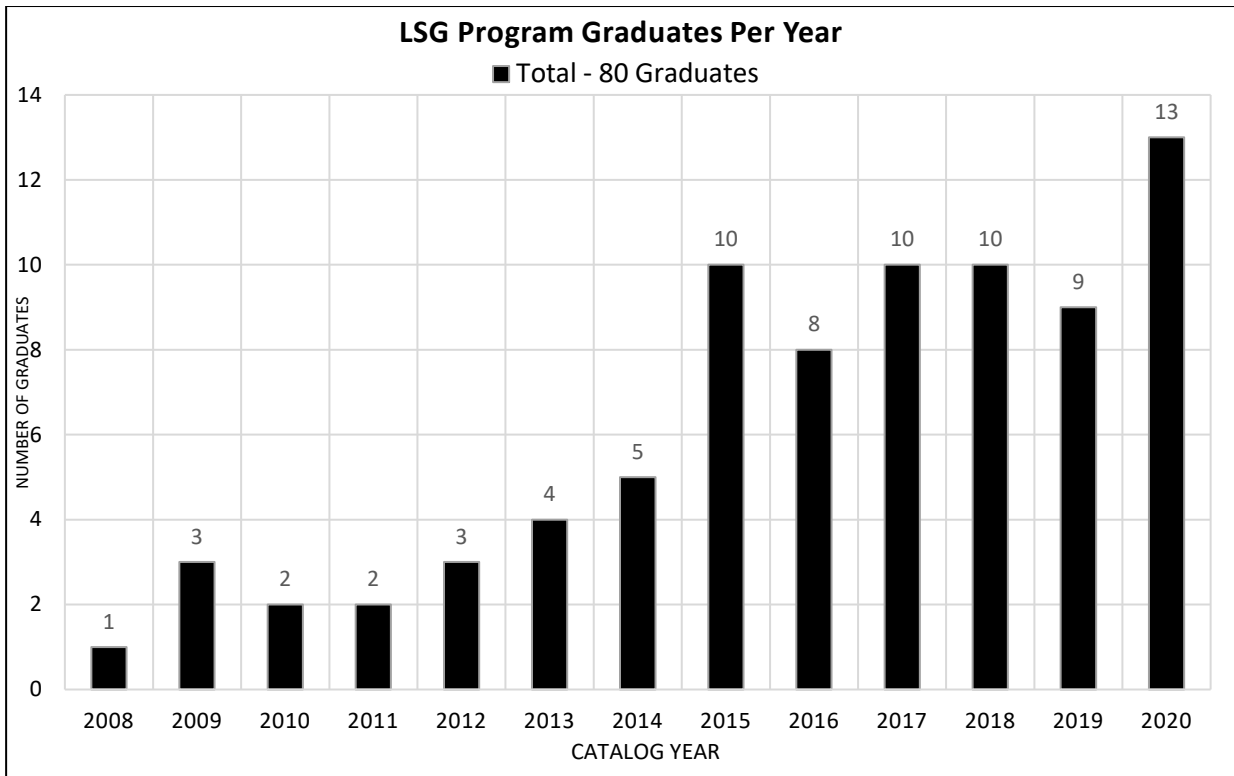


Figure 4. BAS and AS Land Surveying and Geomatics Graduates (2008-2020*). Note: The AS-LSG degree was first cataloged in Fall 2015. *2020 Projected

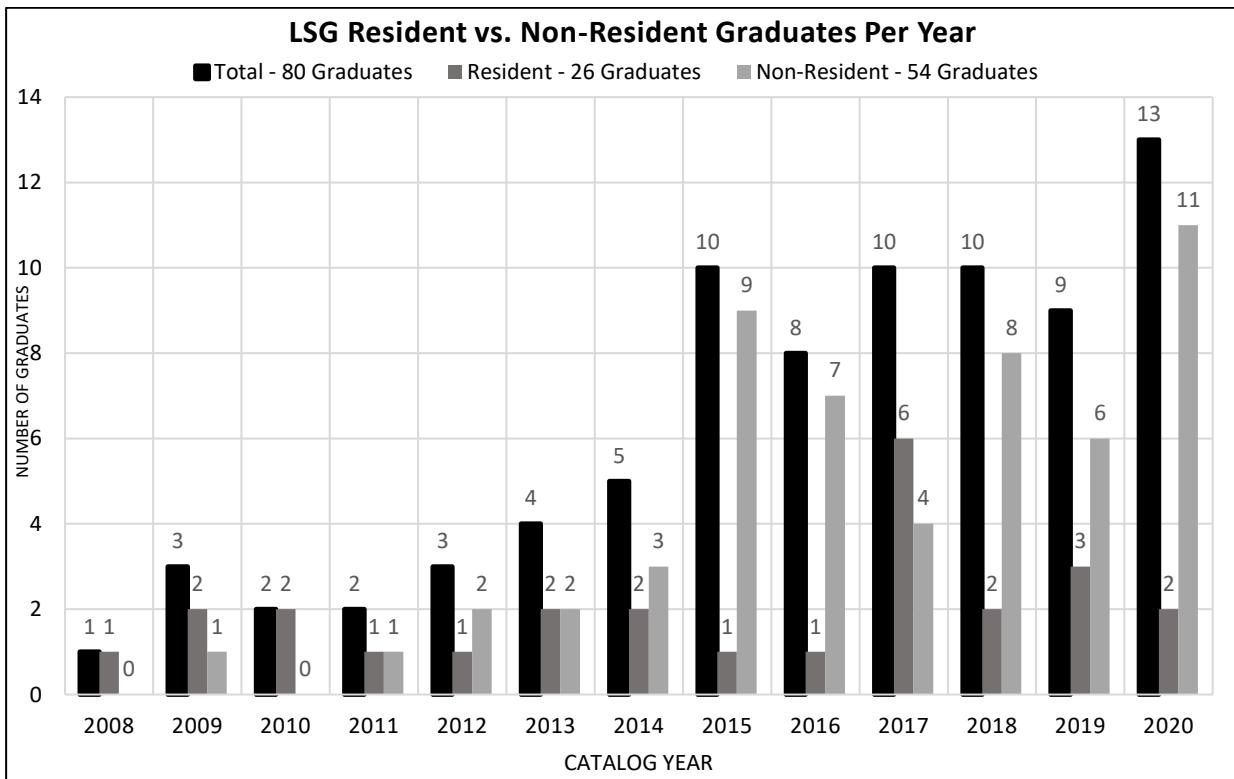


Figure 5. BAS and AS Land Surveying and Geomatics Resident vs. Non-Resident Graduates (2008-2020*)
*2020 Projected

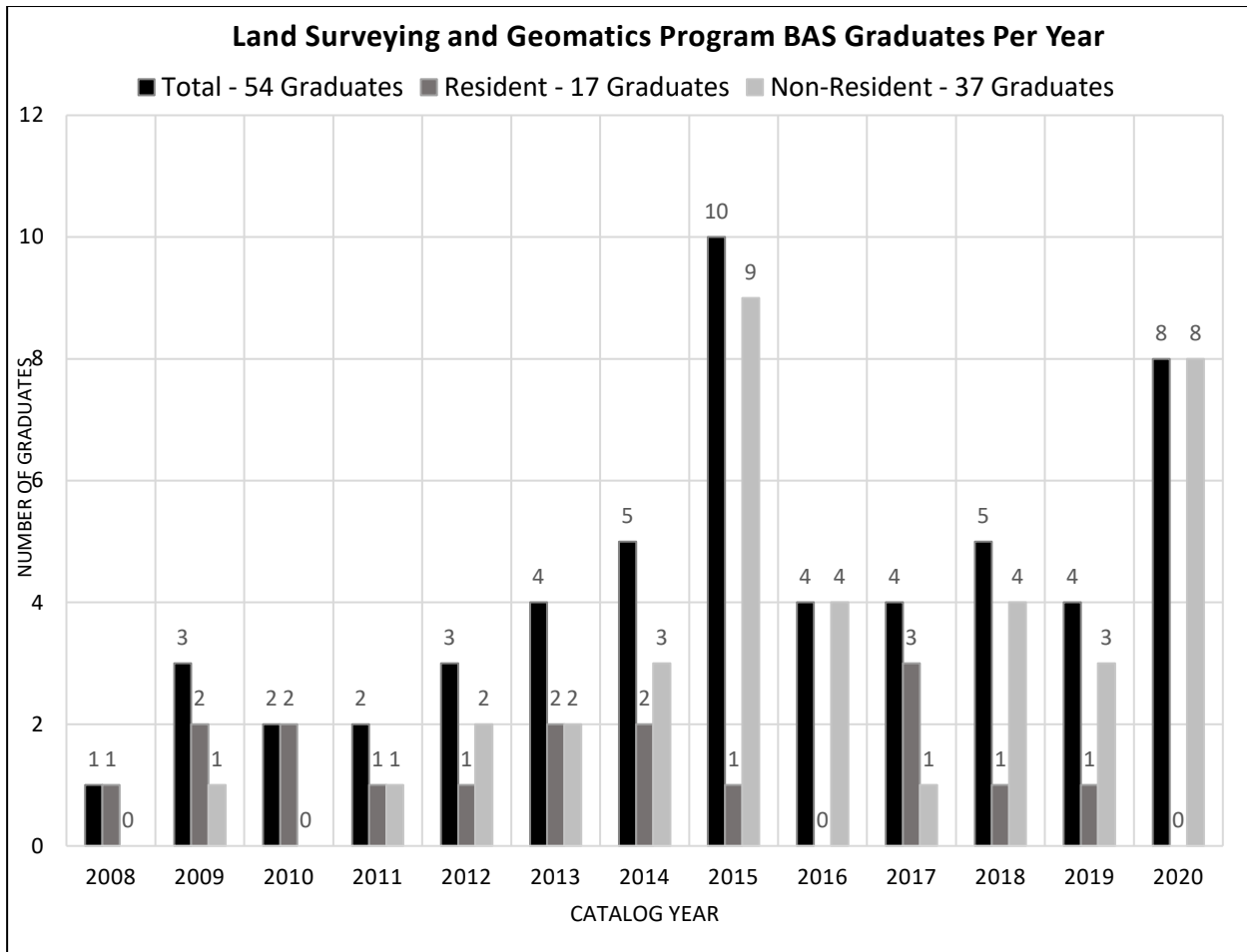


Figure 6. BAS Land Surveying and Geomatics Graduates (2008-2020) *2020 Projected

The LSG program has awarded 17 BAS degrees to students in Nevada from 2008 through 2020. 37 BAS degrees have been awarded to non-residents. California students account for ten of the BAS degrees awarded and are the second highest (non-resident) recipient of BAS degrees in the LSG program. Non-resident BAS graduates are spread across 21 states, including Alaska and Hawaii.

Distance Education and Part Time Faculty

Part Time Faculty offer online classes that are coordinated with the department. Syllabi are made available to all part-time instructors to ensure the same course outcomes in all sections of a class. The LSG faculty delivers online classes to students within our service area and beyond as needed, via distance education technologies.

While a few surveying classes have been offered through Interactive Audio Video in the past, there were several problems with this delivery method. New software has made using IAV classrooms more manageable. IAV systems have been incorporated into the computer labs in Battle Mountain, Elko, Ely, Pahrump and Winnemucca. We have embraced internet class technologies such as WebCampus and remote access virtual computer labs to allow students, who do not have the expensive systems and software required to take all our course work online.

Student Resources

When the High Tech Center was added to the Elko campus, the department gained, for the first time, adequate up-to-date facilities for all of computer classes in Elko. The Land Surveying program currently has access to three instructional computer labs on the Elko campus, each with 25 computers, a smart board, Elmo, and printers. There are two instructional computer labs at the Pahrump campus and one lab each in Battle Mountain, Ely, and Winnemucca, as well as open labs for student use on the Elko and Pahrump campuses. Open lab hours are maintained at all of the outlying centers. The open lab on the Elko campus has 72 stations and is a shared facility with the Elko High School. In addition to the High Tech Center, the Carl A. Diekhans Center for Industrial Technology (DCIT) Building houses the surveying equipment room and contains 27 computer stations licensed with Trimble Business Center. Along with the instructional computer labs available on the Elko campus and four other GBC sites, the LSG Department has access to a remote lab consisting of 32 Dell blade servers and a Dell NAS storage array. This lab supports students throughout our service area with access to specialized software and hardware not usually available in the rural communities. The remote access lab is used by several departments including Science, Education, Electrical Technology, and CT. Additional software is acquired through special academic pricing from various specialty software companies such as Adobe, Trimble, ERSI, Microsoft, Carlson, and others. The cost of the annual license fees for these programs is covered entirely by lab fees.

Current Surveying Lab Equipment List

Equipment	Quantity	Equipment	Quantity
DJI Phantom 4 <i>Pro</i>	1	4.65 m Compression Lock Adjustable Tip Prism Pole - Red and White	4
Trimble M3 5" Total Station	1	CST/berger Magna-Trak 102 Magnetic Locator	1
Trimble R6 GNSS Receiver	1	100' Minvar Low Expansion base line tape	1
Trimble R6 Model 2 GNSS Receiver	1	Topcon Auto Level AT G2 and G3	2
Trimble R6 Model 3 GNSS Receiver	1	Carlo Zeiss Ni 2 Auto Level	1
Trimble 4800 GNSS Receiver	4	Nikon Auto Level AZ-1 and AX0-1S	2
Trimble Data Collector TSC1	3	Nikon Theodolite NT-2	1
Trimble Data Collector Ranger TSC3	2	Lietz Theodolite TS20A	1
TDS Data Logger Ranger	1	Trimble Total Station Geodimeter 600 CU (3601 DR and 3602 DR)	2
Trimble Data Logger TSCe	3	Topcon Total Station GTS-2 and GTS-3	3
Trimble 1000 mAH battery	2	Topcon Total Station GPT-3003	1
Trimble TDL 450 H Series Radios	1	Sokkisha Total Station V2	2
Trimble HPB450 radio modem (Positioning Data Link)	2	Lufkin 100' Steel tape	6
Trimble Lithium-Ion Rechargeable Battery Pack 2.4 Ah 11.1 v	4	100' Seco PVC-coated fiberglass tapes	6
Trimble Charging unit Lot # 13193 Sept 05	1	Seco Optical Plummet Twist Focus Tribrach/w adapter	4
Mean Well Chargers	2	CTS/berger OPTIMA all metal prism	2

12 Volt Interstate Batteries	2	Omni Prism	4
SURVEY PRO TDS RECON	1	AutoRanger-S EDM	1
Fixed-Height Aluminum GPS Antenna Tripod with 2 m Center Staff	4	Lietz DT5 EDM	1
Aluminum SECO BI-PODS	3	Orange Construction Vests	10
Chicago Steel Tape 14' level rod (in tenths)	4	Hammers	6
Ingenuity 5' Wooden Tripod	2	HP DESIGN JET 755CM	1
Trimble Fiberglass 2 Meter Rods	3	CANON iP6650 image PROGRAF	1
Trimble Fiber Carbon 2 Meter Rods	3	Topcon Wooden Tripods	1
Pacific Crest Tripod	1	Monsen Wooden Tripods	3
Sokkia Wooden Tripods	3	Sub Surface Instrument Magnetic Locator	1

Bachelor of Applied Science - Land Surveying/Geomatics Emphasis

Graduates with a BAS with an emphasis in Land Surveying/Geomatics will be able to:

- Proficiently apply sound measurement methods, mathematics, science, and surveying tools to collect, analyze, edit, and present spatial information in professional applications.
- Develop a sound background in the humanities, social sciences, and the arts, to function in multicultural and diverse environments by meeting or exceeding ABET and GBC's BAS general education requirements and provide fundamentals in business management to enable graduates to understand business environments and decision-making processes.
- Convey spatial information in graphical, textual, and verbal forms as an individual or as a collaborating member of a professional team.
- Prepare graduates to take and pass the Fundamentals of Land Surveying examination developed by the National Council of Examiners for Engineering and Surveying (NCEES).
- Satisfy the educational requirements for licensure required by NRS.625.270 as a professional Land Surveyor in Nevada and recognize the benefit of life-long learning by participating in continuing education as students or as instructors.

Entrance to the Land Surveying/Geomatics Emphasis requires an earned associate degree and the completion of a college-level trigonometry course.

Lower-Division Prerequisites

The following courses or transfer equivalents are prerequisites for completion of the upper-division emphasis requirements:

CADD 121 CAD for Land Surveyors

GIS 109 Introduction to Geographic Information Systems

MATH 181 Calculus I

PHYS 151 General Physics I

STAT 152 Introduction to Statistics

SUR 280 Fundamentals of Geomatics I

SUR 281 Fundamentals of Geomatics II

SUR 290 Introduction to Urban Development

U.S. and Nevada Constitution*

I. General Education (Required for LSG BAS) COM 101 Oral Communication, or THTR 102 Introduction to Stage Voice, or THTR 221 Oral Interpretation3

PHIL 311 Professional Ethics3

ENG 333 Professional Communications.....	3
INT 339 Integrative Humanities Seminar, or INT 349 Integrative Social Science Seminar	3
INT 359 Integrative Mathematics Seminar, or INT 369 Integrative Science Seminar	3
Total credits for Section I	15

SUGGESTED COURSE SEQUENCE*	
BAS—Land Surveying/Geomatics	
FALL 1st Semester Credits	
COM 101 Oral Communication, or THTR 102 Introduction to Stage Voice, or THTR 221 Oral Interpretation (3)	
INT 339 Integrative Humanities Seminar, or INT 349 Integrative Social Science Seminar (3)	
SUR 320 GIS for Surveyors (3)	
SUR 340 Photogrammetry and Remote Sensing (3)	
SUR 360 Public Land Survey System (3)	
TOTAL 15	
SPRING 2nd Semester Credits	
INT 359 Integrative Mathematics Seminar, or INT 369 Integrative Science Seminar (3)	
ENG 333 Professional Communications (3)	
PHYS 152 General Physics II, or	
PHYS 181 Physics for Scientists and Engineers II (4)	
SUR 330 Introduction to Least Squares Adjustment (3)	
SUR 365 Legal Descriptions (3)	
TOTAL 16	
FALL 3rd Semester Credits	
MATH 182 Calculus II (4)	
PHIL 311 Professional Ethics (3)	
MGT 310 Foundations of Management Theory and Practice (3)	
SUR 440 Geodetic and GPS Surveying (3)	
SUR 460 Advanced Boundary Analysis (3)	
TOTAL 16	
SPRING 4th Semester Credits	
FIN 310 Applied Accounting and Finance (3)	
MGT 323 Organizational and Interpersonal Behavior or MGT 367 Human Resource Management (3)	
CADD 421 Advanced CAD for Land Surveyors (3)	
SUR 450 Construction Surveying, or SUR 455 Mine Surveying (3)	
SUR 495 Land Surveying/Geomatics Capstone (3)	
TOTAL 15	
Minimum Credits = 62	

II. Emphasis Requirements	
SUR 320 GIS for Surveyors	3
SUR 330 Introduction to Least Squares Adjustment	3
SUR 340 Photogrammetry and Remote Sensing	3
SUR 360 Public Land Survey System	3
SUR 365 Legal Descriptions	3
SUR 440 Geodetic and GPS Surveying	3
SUR 450 Construction Surveying, or SUR 455 Mine Surveying ...	3
SUR 460 Advanced Boundary Analysis	3
SUR 495 Land Surveying/Geomatics Capstone	3
CADD 421 Advanced CAD for Land Surveyors	3
MATH 182 Calculus II.....	4
Total credits for Section II	34
III. Applied Science Core	
FIN 310 Applied Accounting and Finance	3
MGT 310 Foundations of Management Theory and Practice	3
MGT 323 Organizational and Interpersonal Behavior, or	
MGT 367 Human Resource Management	3
AMS 320 Science and Engineering in Technology, or	
INT 369 Integrative Science Seminar, or	
PHYS 152 General Physics II, or	
PHYS 181 Physics for Scientists and Engineers II (PHYS Required).....	4
Total credits for Section III	13
Total credits for Section I, II, and III.....	62

*All students graduating from Nevada institutions of higher education must satisfy the U.S. and Nevada Constitutions requirement. Contact your academic advisor for details.
 *Students admitted to the BAS Program with an associate degree other than an Associate of Arts or Associate of Science will be required to take both INT 339 and INT 349, increasing the BAS-LSG Degree total credits to 65 for graduation.

Associate of Science - Land Surveying/ Geomatics (Pattern of Study)

Graduates with an AS in Land Surveying/Geomatics will be able to:

- Proficiently apply sound measurement methods, mathematics, science, and surveying tools to collect, analyze, edit, and present spatial information in professional applications.
- Demonstrate competency in the fundamentals and applications of land surveying, and the acquisition and management of spatial data.
- Prepare graduates for the Land Surveying/Geomatics Bachelor of Applied Science program or technical geospatial employment.

SUGGESTED COURSE SEQUENCE	Credits		
AS—Land Surveying/Geomatics		I. General Education Requirements	
FALL—1st Semester Credits		Communication and Expressions	
AST 101 General Astronomy	3	English (ENG 101, 102 required)	6
COM 101 Oral Communication or, THTR 102 Introduction to Stage Voice, or THTR 221 Oral Interpretation	3	Communications (COM 101 Oral Communication, or THTR 102 Introduction to Stage Voice, or THTR 221 Oral Interpretation required)	3
ENG 101 Composition I	3	Fine Arts (THTR 100 recommended)	3
CADD 121 CAD for Land Surveyors	3	Logical and Scientific Reasoning	
ENV 100 Humans and the Environment	3	STAT 152 Introduction to Statistics	3
TOTAL 15		Science (AST 101 and ENV 100 recommended)	6
SPRING—2nd Semester Credits		Human Societies and Experience	
THTR 100 Introduction to Theatre	3	Social Science (PSC 101 recommended)	3
ENG 102 Composition II	3	PSY 101 General Psychology	3
GIS 109 Introduction to Geographic Information Systems	3	Humanities (HIST 105 recommended)	3
STAT 152 Introduction to Statistics	3	Technological Proficiency	
PSY 101 General Psychology	3	Technology (GIS 109 required)	3
TOTAL 15		Foundations	
FALL—3rd Semester Credits		Science (PHYS 151 General Physics I or PHYS 180 Physics for Scientists and Engineers I required)	4
SUR 280 Fundamentals of Geomatics I	4	Mathematics (MATH 181 Calculus I required)	4
PHYS 151 General Physics I or PHYS 180	4	II. Emphasis Courses (18 Credits Required)	
HIST 105 European Civilization I to 1648	3	CADD 121 CAD for Land Surveyors	3
GEOL 101 Exploring Planet Earth	4	GEOL 101 Exploring Planet Earth	4
TOTAL 15		STAT 152 Introduction to Statistics	3
SPRING—4th Semester Credits		SUR 280 Fundamentals of Geomatics I	4
PSC 101 Introduction to American Politics*	3	SUR 281 Fundamentals of Geomatics II	4
MATH 181 Calculus I	4	SUR 290 Introduction to Urban Development	4
SUR 281 Fundamentals of Geomatics II	4	*All students graduating from Nevada institutions of higher education must satisfy the U.S. and Nevada Constitutions requirement. HIST 101 & HIST 102 (6 Credits) also meet the US & NV Constitution requirement.	
SUR 290 Introduction to Urban Development	4		
TOTAL 15			
Minimum Credits = 60			

Data for Change

Using data from the U.S. Bureau of Labor Statistics, program models from sister institutions, an advisory board, and student surveys; the LSG program continually monitors the needs of the students and adjusts programs to prepare students to excel in the workforce. The U.S. Bureau of Labor Statistics, covering the present decade, indicates a growing need for a well-trained and

educated work force. The following information was collected from their web site. This information is widely used in career guidance and projecting long-range employment trends.

Employment

Projections of the labor force and the aggregate economy serve as the basis for employment projections. Slower projected growth in the civilian non institutional population and declining labor force participation rates limit growth in the labor force, which in turn limits economic growth.

- The labor force is projected to grow 0.5 percent per year from 2018 to 2028, compared with an annual growth rate of 0.8 percent during the 2008-18 decade. An aging population and labor force will contribute to changes expected over the coming decade including a continued decline in the labor force participation rate and continued growth in employment in healthcare and related industries and occupations.
- Older workers, those ages 65 years and older, are increasingly staying in the workforce. The labor force participation rate for these workers is expected to increase to 23.3 percent by 2028. Conversely, the labor force participation rate for those ages 16 to 24 is projected to continue to decline, to 51.7 percent. This decline is expected due to increased time spent in school and displaced opportunities as older workers fill jobs historically held by younger workers.
- The share of workers ages 55 and older--a group that includes baby boomers, who are staying in the workforce longer--is projected to continue to increase over the 2018–28 decade, from 23.1 percent to 25.2 percent.

Industry employment

BLS analyzes future demand for different types of goods and services, and then projects the employment necessary to produce them. Industry employment is projected to grow at an annual rate of 0.5 percent from 2018 to 2028, slower than the annual rate of 0.8 percent from 2008 to 2018.

- The service-providing sector will grow at a projected rate of 0.6 percent annually, slightly faster than the annual rate of 0.5 percent for industry employment overall. This growth is projected to add more than 7.6 million jobs, resulting in 136.8 million jobs in the service-providing sector by 2028. After declining slightly from 2008 to 2018 (-0.3 percent annually), the goods-producing sector is expected to change little from 2018–28, with an annual growth rate of 0.1 percent.
- The sectors projected to experience the fastest annual employment growth are health care and social assistance (1.6 percent), private educational services (1.2 percent), and construction (1.1 percent). These three sectors alone are projected to add more than 4.6 million jobs by 2028--including 3.4 million new jobs projected in healthcare and social assistance.

- Five sectors are projected to experience employment declines from 2018 to 2028: retail trade, wholesale trade, utilities, federal government, and manufacturing. Retail trade is projected to decline by 0.1 percent annually, resulting in an employment decrease of 153,700 jobs. One factor contributing to this decline is a shift to e-commerce, which is also driving employment growth in the transportation and warehousing sector.

Employment by major industry sector

Industry Sector	Thousands of Jobs			Change		Percent Distribution			Compound Annual Rate of Change	
	2008	2018	2028	2008 - 2018	2018 - 2028	2008	2018	2028	2008 - 2018	2018 - 2028
Total⁽¹⁾⁽²⁾	149,276.0	161,037.7	169,435.9	11,761.7	8,398.2	100.0	100.0	100.0	0.8	0.5
Nonagriculture wage and salary⁽³⁾	137,991.0	149,803.7	157,662.0	11,812.7	7,858.3	92.4	93.0	93.1	0.8	0.5
Goods-producing, excluding agriculture	21,277.9	20,661.3	20,872.7	-616.6	211.4	14.3	12.8	12.3	-0.3	0.1
Mining	709.9	683.3	727.9	-26.6	44.6	0.5	0.4	0.4	-0.4	0.6
Construction	7,162.5	7,289.3	8,096.8	126.8	807.5	4.8	4.5	4.8	0.2	1.1
Manufacturing	13,405.5	12,688.7	12,048.0	-716.8	-640.7	9.0	7.9	7.1	-0.5	-0.5
Services-providing excluding special industries	116,713.1	129,142.4	136,789.3	12,429.3	7,646.9	78.2	80.2	80.7	1.0	0.6
Utilities	558.8	554.6	537.2	-4.2	-17.4	0.4	0.3	0.3	-0.1	-0.3
Wholesale trade	5,875.0	5,852.5	5,754.0	-22.5	-98.5	3.9	3.6	3.4	0.0	-0.2
Retail trade	15,289.1	15,833.1	15,679.4	544.0	-153.7	10.2	9.8	9.3	0.4	-0.1
Transportation and warehousing	4,513.6	5,419.1	5,741.4	905.5	322.3	3.0	3.4	3.4	1.8	0.6
Information	2,983.8	2,828.1	2,833.7	-155.7	5.6	2.0	1.8	1.7	-0.5	0.0
Financial activities	8,206.1	8,568.8	8,849.4	362.7	280.6	5.5	5.3	5.2	0.4	0.3
Professional and business services	17,792.3	20,999.5	22,661.9	3,207.2	1,662.4	11.9	13.0	13.4	1.7	0.8
Educational services	3,039.8	3,727.5	4,201.0	687.7	473.5	2.0	2.3	2.5	2.1	1.2
Health care and social assistance	16,188.6	19,939.3	23,335.4	3,750.7	3,396.1	10.8	12.4	13.8	2.1	1.6
Leisure and hospitality	13,436.2	16,348.5	17,904.9	2,912.3	1,556.4	9.0	10.2	10.6	2.0	0.9
Other services	6,320.5	6,622.4	6,716.7	301.9	94.3	4.2	4.1	4.0	0.5	0.1
Federal government	2,762.0	2,796.0	2,670.2	34.0	-125.8	1.9	1.7	1.6	0.1	-0.5
State and local government	19,747.3	19,653.0	19,904.0	-94.3	251.0	13.2	12.2	11.7	0.0	0.1
Agriculture, forestry, fishing, and hunting⁽⁴⁾	2,071.4	2,310.0	2,320.6	238.6	10.6	1.4	1.4	1.4	1.1	0.0
Agriculture wage and salary	1,208.6	1,547.2	1,587.2	338.6	40.0	0.8	1.0	0.9	2.5	0.3
Agriculture self-employed	862.8	762.8	733.4	-100.0	-29.4	0.6	0.5	0.4	-1.2	-0.4
Nonagriculture self-employed	9,213.6	8,924.0	9,453.4	-289.6	529.4	6.2	5.5	5.6	-0.3	0.6

Footnotes:
¹ Employment data for wage and salary workers are from the BLS Current Employment Statistics survey, which counts jobs, whereas self-employed and agriculture, forestry, fishing, and hunting are from the Current Population Survey (household survey), which counts workers.
² Individual sectors do not necessarily add to major sectors due to rounding.
³ Includes wage and salary data from the Current Employment Statistics survey, except private households, which is from the Current Populations Survey. Logging workers are excluded.
⁴ Includes agriculture, forestry, fishing, and hunting data from the Current Population Survey, except logging, which is from Current Employment Statistics survey. Government wage and salary workers are excluded.

Figure 7. Employment by Major Industry Sector (2018-2028) Source: BLS

Occupational Employment

Projected industry employment is distributed among occupations based on how industries are expected to use those occupations. Employment in nearly all major occupational groups is

projected to increase from 2018 to 2028. The fastest growing groups include healthcare support occupations (18.2 percent), personal care and service occupations (17.4 percent), computer and mathematical occupations (12.7 percent), healthcare practitioners and technical occupations (11.9 percent), and community and social service occupations (11.2 percent).

- Of the 30 fastest growing occupations, 18 are in healthcare and related occupations. Increased demand for healthcare services from an aging population and people with chronic conditions will drive much of the expected employment growth. The fastest growing among these occupations are home health aides and personal care aides. Other healthcare occupations with rapid projected growth--including nurse practitioners, physician assistants, and medical assistants will be in greater demand as the healthcare industry moves toward delivery of team-based care. See www.bls.gov/emp/tables/fastest-growing-occupations.htm.
- Computer and mathematical occupations account for 6 of the 30 fastest growing occupations. Increasing use of mobile and connected devices will drive demand for application software developers, which is projected to experience employment growth of 25.6 percent. The need for robust online security will also rise as more connected devices enter homes and workplaces. This increased need for cybersecurity will drive demand for information security analysts, employment of which is projected to grow by 31.6 percent.
- Advances in, and implementation of, renewable energy technologies are expected to drive employment growth in the two occupations with the highest projected growth rates: solar photovoltaic installers (63.3 percent) and wind turbine technicians (56.9 percent). Despite the rapid growth projected in these occupations, their small employment size means that the growth is projected to yield only 6,100 new jobs and 3,800 new jobs, respectively.
- Three occupational groups are projected to have declining employment over the 2018–28 decade. Employment in sales and related occupations is expected to decline by 0.5 percent as consumers increasingly make purchases online through e-commerce. Office and administrative support occupations and production occupations are also expected to have employment declines, 2.6 percent and 4.5 percent, respectively, as advancements in technology and automation increase productivity or shift work to other occupations.

Note: The projections are the foundation of the BLS Occupational Outlook Handbook (OOH), one of the nation's most widely used career information resources. The OOH reflects BLS employment projections for the 2018–28 decade. The updated OOH is available online at www.bls.gov/ooh.

Fastest growing occupations

2018 National Employment Matrix title and code	Employment		Change, 2018–28		Median annual wage, 2018 ⁽¹⁾	
	2018	2028	Number	Percent		
Total, all occupations	00-0000	161,037.7	169,435.9	8,398.1	5.2	\$38,640
Solar photovoltaic installers	47-2231	9.7	15.8	6.1	63.3	\$42,680
Wind turbine service technicians	49-9081	6.6	10.3	3.8	56.9	\$54,370
Home health aides	31-1011	831.8	1,136.6	304.8	36.6	\$24,200
Personal care aides	39-9021	2,421.2	3,302.1	881.0	36.4	\$24,020
Occupational therapy assistants	31-2011	43.8	58.3	14.5	33.1	\$60,220
Information security analysts	15-1122	112.3	147.7	35.5	31.6	\$98,350
Physician assistants	29-1071	118.8	155.7	37.0	31.1	\$108,610
Statisticians	15-2041	44.4	58.0	13.6	30.7	\$87,780
Nurse practitioners	29-1171	189.1	242.4	53.3	28.2	\$107,030
Speech-language pathologists	29-1127	153.7	195.6	41.9	27.3	\$77,510
Physical therapist assistants	31-2021	98.4	125.0	26.7	27.1	\$58,040
Genetic counselors	29-9092	3.0	3.8	0.8	27.0	\$80,370
Mathematicians	15-2021	2.9	3.6	0.8	26.0	\$101,900
Operations research analysts	15-2031	109.7	137.9	28.1	25.6	\$83,390
Software developers, applications	15-1132	944.2	1,185.7	241.5	25.6	\$103,620
Forest fire inspectors and prevention specialists	33-2022	2.2	2.8	0.5	24.1	\$39,600
Health specialties teachers, postsecondary	25-1071	254.8	313.9	59.1	23.2	\$97,370
Phlebotomists	31-9097	128.3	157.8	29.5	23.0	\$34,480
Physical therapist aides	31-2022	49.8	61.2	11.3	22.8	\$26,240
Medical assistants	31-9092	686.6	841.5	154.9	22.6	\$33,610
Substance abuse, behavioral disorder, and mental health counselors	21-1018	304.5	373.1	68.5	22.5	\$44,630
Marriage and family therapists	21-1013	55.3	67.7	12.3	22.3	\$50,090
Massage therapists	31-9011	159.8	195.2	35.4	22.2	\$41,420
Cooks, restaurant	35-2014	1,362.3	1,661.3	299.0	21.9	\$26,530
Physical therapists	29-1123	247.7	301.9	54.2	21.9	\$87,930
Respiratory therapists	29-1126	134.0	162.0	27.9	20.8	\$60,280
Market research analysts and marketing specialists	13-1161	681.9	821.1	139.2	20.4	\$63,120
Actuaries	15-2011	25.0	30.0	5.0	20.1	\$102,880
Computer numerically controlled machine tool programmers, metal and plastic	51-4012	24.3	29.2	4.9	20.0	\$53,190
Nursing instructors and teachers, postsecondary	25-1072	69.0	82.8	13.8	20.0	\$73,490

Footnotes:
⁽¹⁾ Data are from the Occupational Employment Statistics program, U.S. Bureau of Labor Statistics. Wage data cover non-farm wage and salary workers and do not cover the self-employed, owners and partners in unincorporated firms, or household workers.
Source: Employment Projections program, U.S. Bureau of Labor Statistics

Figure 8. Fastest Growing Occupations (2018-2028) Source: BLS

Education and Training Categories

75% of the 30 occupations projected to grow fastest from 2018 to 2028 typically require some form of post-secondary education for entry. The chart below details unemployment rates and earnings by educational attainment

Typical entry-level education	2018 Employment		Employment change, 2018–28 (percent)	Median annual wage, 2018 ⁽¹⁾
	Number	Percent distribution		
Total, all occupations	161,037.7	100.0	5.2	\$38,640
Doctoral or professional degree	4,382.9	2.7	9.0	\$105,700
Master's degree	2,685.1	1.7	13.7	\$73,580
Bachelor's degree	35,479.2	22.0	7.7	\$73,960
Associate's degree	3,572.6	2.2	7.9	\$53,700
Postsecondary nondegree award	9,993.1	6.2	8.2	\$38,640
Some college, no degree	4,105.6	2.5	1.4	\$35,820
High school diploma or equivalent	62,426.8	38.8	2.9	\$37,020
No formal educational credential	38,392.3	23.8	5.0	\$24,430

Footnotes:
⁽¹⁾ Data are from the Occupational Employment Statistics program, U.S. Bureau of Labor Statistics. Wage data cover non-farm wage and salary workers and do not cover the self-employed, owners and partners in unincorporated firms, or household workers.
Note: The occupational employment and growth rates shown in this table include projected growth in all jobs from 2018–28, not just entry-level jobs. Entry-level education reflects 2018 requirements—BLS does not project educational requirements.
Source: Employment Projections program, U.S. Bureau of Labor Statistics

Figure 9. Earnings by Educational Attainment (2018-2028) Source: BLS

Growing Occupations in Land Surveying Areas for 2018-2028

Employment of surveyors is projected to grow 6 percent from 2018 to 2028, about as fast as the average for all occupations, although down 4 percent from 2008 to 2018. Employment growth will result from increased construction related to improving the nation's infrastructure. Surveyors will continue to be needed for construction and resource extraction projects. States rich in oil and gas may continue to see higher demand for surveyors due to growth in extraction projects in those areas. Demand for traditional surveying services is closely tied to construction activity; therefore, job opportunities will vary by geographic region and often depend on local economic conditions. When real estate sales and other construction activity slow down, surveyors may face greater competition for jobs. However, because surveyors can work on many different types of projects, they may have steadier work than others in the industry when construction slows. In addition, some will also be hired by county and state governments for land/boundary administration.

Land Surveying Job Prospects for 2018-2028

Most of the projected job growth in this Architecture and Engineering Occupations group is in the engineer occupations (surveying is grouped with engineer occupations), as their services will be in demand in various areas such as rebuilding of infrastructure, renewable energy, oil and gas extraction, and robotics. Job opportunities for those with a bachelor's degree in surveying or a related field are expected to be good. Increased use of sophisticated technology and mathematics has resulted in higher educational requirements. As a result, those with the right combination of skills and a bachelor's degree from a school accredited by ABET will have the best job opportunities. Job prospects should be particularly good in fast growing industries, such as oil and gas mining.

Source: Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, Surveyors, on the Internet at <https://www.bls.gov/ooh/architecture-and-engineering/surveyors.htm> (visited January 10, 2020).

Adequacy of Evaluation Policy and Practices

Program faculty use course evaluations done each semester to enhance their classes and approaches to subjects. The faculty feels that the formal source of regular student evaluations along with comments and suggestions made during advisory board meetings and department meetings adequately serve our evaluation needs. As outlined in GBC Institutional Assessment Plan 2015-2020, every academic program identifies expected learning outcomes in the college catalog and maintains a five-year assessment plan outlining the learning outcomes and when and how those outcomes will be assessed. Each program outcome is assessed at least once over a five-year period. At the end of every academic year, each program reports on the results of student learning outcomes assessments. In addition, programs maintain a current curriculum map that reports how each required course supports program learning outcomes.

<https://www.gbcnv.edu/IR/index.html>. Figure 10 below shows all current LSG courses offerings rated as excellent (based on 461 student evaluations).

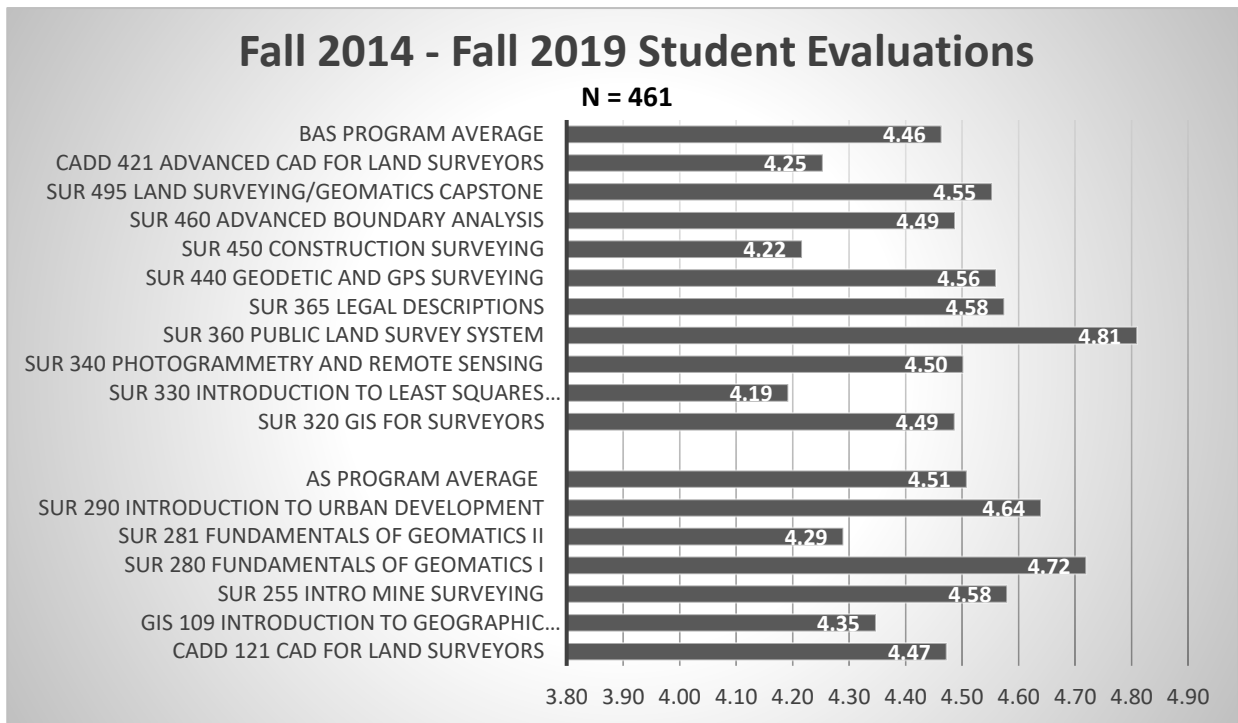


Figure 10. BAS Land Surveying and Geomatics Fall 2014-Fall 2019 Student Evaluations. IDEA Score 4.0 to 5.0 = Excellent | IDEA Score 3.5 to 3.9 = Commendable | IDEA Score 3.0 to 3.4 = Satisfactory | IDEA Score 0 to 2.9 = Unsatisfactory

Response to an Agency

The Online Land Surveying and Geomatics Bachelor Degree Program of Applied Science was co-developed by Great Basin College (GBC) and the Nevada Association of Land Surveyor’s Advisory Committee to satisfy the educational requirements for licensure required by NRS.625.270 as a professional Land Surveyor in Nevada. The Land Surveying and Geomatics program was also implemented in response to the growing need for licensed professional surveyors in Nevada to capture, store, process, and manage spatial data. The four-year bachelor degree program in Land Surveying and Geomatics has served Nevada students and distance learners from around the country effectively since its inception in 2005.

Fees and Tuition

Our BAS and AS degree combines for 122 credits. With the tuition, lab fees, and technology fees, it runs approximately \$142 per credit. Students pay approximately \$1300 a semester in tuition (enrolled in three classes). National average per semester for books is around \$300.

Notwithstanding currently posted tuition and fees, all fees, tuition or other charges which students are required to pay each semester are subject to increase by action of the Board of Regents at any time before the commencement of classes (primarily due to budgetary shortfalls). The amount one is charged at the time of registration is not a final bill and may be increased. Each student will receive a supplemental invoice for any additional amounts which the Board of Regents may impose.

The fees listed in the Schedule for each class assume Nevada Residency. They are calculated as follows:

Semester	FEES FOR NEVADA RESIDENTS - ONLINE	
	Per Lower-Division Credit	Per Upper-Division Credit
Fall 2019	\$108.25	\$173.75
Spring 2020	\$108.25	\$173.75
Summer 2020	\$108.25	\$173.75
Fall 2020	\$110.50	\$177.00

Additional fees: \$5.50 per credit technology fee, plus any applicable lab fees

Program Strengths

The faculty in the LSG department are often requested to share their knowledge and skills sets by speaking and lecturing at seminars, conferences, and continuing education classes on new developments in the field. The following ten categories represent current program strengths.

1. Program Accessibility - 100% online course availability provides complete and total access to all 16 LSG related courses offered each year. This provides consistency and flexibility for our students.
2. Quality of Instruction - A recent 2020 survey of LSG graduates rated “quality of instruction” above average (4.00) based on a Likert scale from 1 to 5, with 5 being the highest score.
3. Institutional Support - Many resources have been made available to the program and GBC is committed to supporting the program by offering funding for computer hardware, software, classroom/lab space and other resources as they have for the past 10 years.
4. High Success Rate - Outcomes among students evidenced by 95% pass rate on NCEES National Fundamentals Surveying exam (2009 – 2019) confirms the program’s effectiveness.
5. Low Tuition Rate - Students graduate with zero to below national average student debt.
6. Local, State, and National Support - Strong support from our state chapters offers the program a voice at the state and national levels.
7. Quality of Degree Program - A recent 2020 survey of LSG graduates rated “quality of degree program” above average (4.08) based on a Likert scale from 1 to 5, with 5 being the highest score.
8. Academic Expectations of Program - A recent 2020 survey of LSG graduates rated “academic expectations” above average (4.00) based on a Likert scale from 1 to 5, with 5 being the highest score.
9. Student Evaluations - 461 students have rated all AS and BAS surveying courses as excellent over a five-year period (2015-2019), with an average program rating of 4.49 out of 5.00.

10. Enrollment - LSG unduplicated program enrollment has increased from 18 enrolled students following Spring 2014 deactivation to 125 (594% increase) unduplicated, enrolled students in Spring 2020.

Program Challenges

Although we have excellent facilities, both at the main campus and in the outlying areas, our single biggest challenge is keeping these facilities current. Both computer hardware and software are constantly changing. Therefore, we are faced with constant change on a limited budget and this is only more difficult with the current budget crisis. The following seven categories represent current “non-technical” program challenges.

1. Rural Service Area - Demographics places GBC at a disadvantage for the recruitment of on-campus students.
2. Program Marketing - An increase in marketing dollars would allow for more outreach and increased enrollment.
3. Low Yield - Implement policy to allow LSG AS completions to be counted for LSG BAS completions in relation to NSHE low yield completions.
4. Keeping Pace - Upgrade the online instructional material to stay current with the changing technological advances.
5. Supervision and Guidance - Hire second full-time professor to pursue ABET and to ensure quality instruction at all levels, including student advising.
6. Quality of Faculty - Provide enough faculty resources to meet required professional development, educational and public outreach, including program development and recruitment within the State of Nevada and beyond.
7. Academic Expectations - Land surveying has been traditionally considered a learned trade that can be only acquired by guided and mentored field experience.

Recommendations/Action Items

1. Continue to update classes, degrees, and material to keep current with industry standards.
2. Organize a review panel to develop short-term and long-term strategies capable of addressing the stated challenges is suggested.
3. Market our AS (Pattern of Study) area to Nevada high school students.

Summary

GBC is committed to the Land Surveying and Geomatics program by maintaining and enhancing the professional development of its faculty:

- Ensure quality instructional material at all levels.
- Measure the high quality of instruction based on 10-year student success rate (95%) in passing the NCEES Fundamentals of Surveying Exam.
- Assure the online model is successful in achieving its objectives of educating students to become professional land surveyors.

2015-2019 enhancements to the land surveying and geomatics professional experience include:

- Creation of an online NALS student chapter
- Creation of a Lambda Sigma student honor society
- Creation of national NSPS competition team
- Creation of LSG AS degree
- Addition of three new courses and four revamped courses
- Addition of three new part-time instructors
- Increased female student enrollment from 5% to 20%
- Added \$2500.00 Latino Surveying Scholarship – NALS Sponsorship
- Added \$2500.00 Women Surveying Scholarship – NALS Sponsorship
- Created 28 hours of professional PDH mentoring credits
- Student organized and led NV NSPS Young Surveyors Network

The following challenges should be addressed by the following means:

- Create a strategic plan that identifies the technological, instructional and financial obstacles in offering both an AS and BAS program and sustaining student enrollment.
- Upgrade the online instructional material to stay current with the changing technological advances
- Provide enough faculty resources to meet onsite instruction and “in field” experiences required for the traditional student.
- Purchase of state-of-the-art surveying equipment to assure students have the proper training to be competitive in their field.

Land Surveying and Geomatics Advisory Board Members

Educational Administration	Great Basin Chapter
Byron Calkins - GBC	Michael Andreozzi
Bret Murphy - GBC	Norman Rockwell
	Carl C. deBaca
Lahontan Chapter	Southern Nevada Chapter
Jerry Juarez	Alan Dill
Steve Parrish	Trent Keenan
Kevin German	

BIOGRAPHY – Byron Calkins

A. Professional Preparation

Undergraduate Institution	Major	Degree & Year
Northern Vermont University	Geographic Information Systems	A.S. 2004
New Mexico State University	Surveying Engineering: ABET Accredited	B.S. 2009
Graduate Institution	Major	Degree & Year
New Mexico State University	Online Learning and Teaching Certification	M.A. 2013
New Mexico State University	Applied Geography	M.A.G 2014

Core Qualifications - Instruction:

Online Instruction in Land Surveying/Geomatics

- Fundamentals of Land Surveying/Geomatics
- LIS/GIS systems
- Remote Sensing & Photogrammetry

Core Qualifications - Engineering & Consulting:

Subsurface Utility & Forensics Engineer

- Subsurface Utility Engineering-Designating/Locating/Forensics Specialty (GPR/EM/GPS)
- GIS Applications for Civil/Surveying Engineering
- Subdivision Surveying & Historical Land Records

Core Qualifications - Climate & Viticulture:

Agricultural Climate Research

- Author of predictive climate model for viticulture parcels in NM

Academic Positions:

2018 - Present Program Supervisor, Advisor, Professor. Great Basin College, Elko, NV

- An online Bachelor of Applied Science degree program with 83 enrolled students
- An online Associate of Science degree program with 40 enrolled students

2014 - 2018 Program Supervisor, Advisor, Instructor. Great Basin College, Elko, NV

- An online Bachelor of Applied Science degree program.
- An online Associate of Science degree program.

2012 - 2014 Adjunct Professor. New Mexico State University, Las Cruces, NM

- Adjunct Professor: Surveying Engineering Department. 100% Face-to-Face Instruction: “Introduction to Land Information Systems” and 100% online instruction “GIS for Land Surveyors.”

B. Alignment - indications or evidence of how your (1) degree(s), and/or (2) research, and/or (3) professional experience, and/or (4) other related experience align with or support your teaching or research activities.

In my experience, the content and components of online curriculum play a vital role in learner success; yet the function and characteristics of the course’s online community is often the backbone and provides the catalyst needed for positive student achievement. By fostering online learning

communities, geographically separated members - often working individually or in small groups - can become communities of common interest regardless of location. I have worked in the private sector for 25 years and know what is expected in a job environment and can bring examples of real-life situations into my online classes.

Past Engineering Projects:

- Project 1: Vermont State Park Campground Site Design (Completed 2019). Employer: CSI
The State of Vermont hired CSI to survey, design, and layout a high elevation (1800') five-unit campground at Mount Ascutney State Park. This site plan includes two ADA compliant cabins complete with water lines, onsite wastewater disposal, road and parking lots, trails, and 700 feet of stone retaining walls. The design and construction effort modeled previous Civilian Conservation Corps historical architectural found in the park. I was responsible for the layout of road, stonewalls, cabin locations, monitoring construction progress, and photographic documentation of construction.
- Project 2: Burlington, VT. Church St. Hazardous Waste Site, VT (Completed 2019). Employer: CSI
Utility Locating for Drilling Operations. Hired to perform a subsurface ground penetrating radar survey (GPR) on a vacant commercial lot previously owned by Burlington Free Press. Radar data was then post processed; cleaning up synthetic artifacts, noise inherent to the 400 MHz frequency and the variable soil dielectric properties. Final maps were produced, and drilling commenced to monitor possible hazardous waste.
- Project 3: Novo Nordisk - NVO (NYSE) (Completed 2018). Employer: CSI
GPR/EM/GPS subsurface utility & forensic surveying within the existing facility and for new exterior construction in Lebanon, New Hampshire.
- Project 4: Bretton Woods Resort (Completed 2018). Employer: CSI
GPR and EM locating of subsurface utilities for new Ski Chair and Lodge expansion at Mt. Washington Hotel in Bretton Woods, NH.
- Project 5: Eversource Energy - ES (NYSE). (Completed 2017). Employer: CSI
Preliminary GPR and EM locating of ROW subsurface utilities for the buried portion (60 mi) of the \$4 B DC electrical line construction through New Hampshire.
- Project 6: Dartmouth College (Completed 2016). Employer: CSI
Forensic Surveying (GPR & GPS) to locate 18th Century undocumented grave sites in Hanover, NH.

C. Academic Endeavors - Teaching (including all courses taught), research, and any other academic activities in the past five years; identify degree of course technology used for teaching (e.g., 25% face-to-face, 75% online; 100% online; 100% face-to-face; etc.). Courses taught multiple times only need to be entered once.

2014 - Present: Professor. Great Basin College, Elko NV

Teach a wide spectrum of Land Surveying and Geomatics undergraduate classes (100% online)

- CADD 121 CAD for Land Surveyors
- CADD 421 Advanced CAD for Land Surveyors
- GIS 109 Introduction to GIS
- GIS 320 GIS in Business and Community
- SUR 280 Fundamentals of Geomatics I
- SUR 281 Fundamentals of Geomatics II

- SUR 290 Introduction to Urban Development
- SUR 320 GIS for Surveyors
- SUR 330 Introduction to Least Squares Adjustment
- SUR 340 Photogrammetry and Remote Sensing
- SUR 440 Geodetic and GPS Surveying
- SUR 450 Construction Surveying
- SUR 460 Advanced Boundary Analysis
- SUR 495 Land Surveying/Geomatics Capstone

D. Products - published, patented, or otherwise contributed to your discipline and/or your teaching in the past five years.

Selected Publications:

- Calkins, Byron. GBC Land Surveying Students Bring Home Top Award at National Competition: May 2016. *Nevada Traverse*, Volume 43, 2, May 2016, p. 9 (1 page).
- Calkins, Byron. Great Basin College: GBC Celebrates Scholarship, Integrity, and Camaraderie: Sep 2017. *Nevada Traverse*, Volume 44, 3, Sep 2017, p. 29 (1 page).

E. Synergistic Activities - public, private, or academic activities you have conducted in the past five years with others to contribute to your discipline, teaching, or community

2015 - Present: Enhancements to the Land Surveying Geomatics professional experience include:

- Creation of an online student chapter
- Creation of a student honor society
- Creation of national competition team
- Addition of three new courses and four revamped courses
- Increased female student enrollment from 5% to 20%
- Added \$2500.00 Latino Surveying Scholarship
- Added \$2500.00 Women Surveying Scholarship
- Created 28 hours of professional development hours (PDH) mentoring credits

Other enhancements to the Land Surveying Geomatics professional experience include the creation of an online Land Surveying/Geomatics Associate of Science (AS) degree program designed to matriculate traditional and non-traditional learners, who have limited post-secondary education, directly into a professional degree seeking program of study. The Associate of Science in Land Surveying and Geomatics prepares the student for entry-level positions in surveying/mapping, civil engineering, resource management, and mining; as well as diverse technical opportunities within federal, state, and local government agencies. In addition to gaining technical employment, the program is also intended to provide a seamless pathway into the Bachelor of Applied Science's (BAS) Land Surveying and Geomatics program.

F. Professional Development - conferences, personal study, additional activities, etc. conducted or attended in the past five years that support improvement of your research and/or teaching activities

I have been an active guest speaker for the Las Vegas, Reno, and Elko professional surveying chapters. I have presented to the Board of Professional Licensure in Las Vegas, NV concerning academic collaboration with UNLV. I have been a guest speaker for the Nevada Trimble User

Conference numerous times, and I was selected as a guest presenter for an ESRI user conference in Phoenix, AZ. These speaking engagements help promote the GBC Land Surveying program and raise the profile of this institution. Furthermore, I have been actively publishing papers in the Nevada Traverse and I have edited and reviewed five separate student papers for publication. Outside of collaborating with the various stakeholders and investors in the Nevada geospatial industry, course design, teaching, advising, mentoring, public speaking, publishing and editing, I have participated in surveying conferences as an attendee and booth presenter.

Ongoing Research - Agricultural Climate Research:

Spatial analysis of future climate structure in Nevada viticulture regions. Current research involves building a model that will identify suitable locations for commercial vineyards in Nevada. Core development of a geographic spatial model involves the synthesis of multiple raster and vector data sets; including Community Climate System Models (CCSM), satellite Landsat 4/5 TM band data, USGS 7.5' quad maps, NRCS soil data, PRISM climate data, vegetation data, digital terrain models, road, town, and government boundaries. My research is to help facilitate commercial development and growth of vineyard agriculture in Nevada.

Certifications:

- USDA: Seasonal high-water interpretation. Soils Certification
- GSSI: Radar Theory and Application. Subsurface Radar Certification.

Memberships and Honor Societies:

- National Society of Professional Surveyors (NSPS)
- Nevada Association of Land Surveyors (NALS)
- Gamma Theta Upsilon International Geographic Honor Society (GTU)
- Lambda Sigma Honor Society (LS)
- El Camino Real de Tierra Adentro Trail Association member (CARTA)
- Bureau of Land Management partner/volunteer (BLM)
- National Audubon Society member/volunteer

BIOGRAPHY – Phil Reimer, PLS

I am an avid Cyclist and USAC Olympic level cycling coach and have had the privilege of coaching the Northern University Cycling Team. As a Professional Land Surveyor, I maintain registration in the State of Nevada, Arizona, California and as a Certified Federal Surveyor. As the Senior Land Surveyor for Farr West Engineering in Reno Nevada, I manage six survey crews. I have over 37 Years of experience in public and private boundary surveys, legal descriptions, American Land Title Association (ALTA) surveys, FEMA flood surveys and certificates, topographic surveys, Bathymetric Surveys and construction surveys. In addition, I am an active member of Professional Land Surveyors' organizations, including the California Land Surveyors Association, Arizona Professional Land Surveyors, CLSA GIS, and Trig Star Committees.

I have lectured for Northern Arizona University Engineering Program and have presented to land surveyor's associations covering a variety of topics including ALTA seminars, Advanced Land Surveys, US Public Land Surveys, and as an instructor for Legal Descriptions seminars for professional development.

Professional Credentials

- Professional Land Surveyor, State of California, License Number 6391
- Professional Land Surveyor, State of Nevada, License Number 13869
- Professional Land Surveyor, State of Arizona License Number 48078
- Certified Federal Surveyor 1348

Computer Software

- Auto Cad V.2018 - Civil 3D
- Trimble Data Collection Software
- Carlson Data Collection software
- Leica Data Collection Software
- Microsoft Office Suite

Professional Organizations

- California land Surveyors Association
- Arizona Professional Land Surveyors Association
- San Luis Obispo GIS Consortium
- CLSA GIS Education Committee

Professional Education

- Adjunct Instructor Great Basin College
- Guest Instructor NAU Survey Boundary Law
- Guest Instructor NAU Survey Boundary Law
- Instructor How to choose your Surveyor
- Instructor Law of Easements
- Instructor Law of Easements

Work Experience

Present

- Farr West Engineering: Senior Land Surveyor

BIOGRAPHY – Shane Trotter, PLS

I am an avid cyclist. I enjoy staying active and helping others. I am the board secretary for NALS Lahontan Chapter. I am an advocate for land surveying, and I continue to present land surveying as a career option to high school students. I also author articles focused on promoting land surveying and the importance of education.

Education:

Bachelor of Applied Science, Great Basin College

Major: Land Surveying and Geomatics

Honors: Cum Laude

Work Experience:

Present

Supervisory Land Surveyor, Field Chief – Detail, Bureau of Land Management

Plan and conduct cadastral land surveys, including records research, field work, office drafting and calculations. Assist in writing special instructions, field reports and land surveyor reports.

Assist realty specialists with survey related questions and survey requests. Coordinate and maintain equipment and safety protocols.

Core Qualifications

- Highway alignment retracements
- Property boundary retracements
- PLSS retracements for material pit surveys
- Design mapping surveys
- Construction control surveys
- High accuracy reference network surveys
- LiDAR for monitoring and as built surveys
- Topographic surveys
- Bathymetric surveys

Certifications

Professional Land Surveyor, State of Nevada, License Number 28470

Awards

NALS 2018 Editorial of the Year Award

Professional Publications

The Nevada Traverse, Vol. 44, No. 3, “Recruiting Future Land Surveyors”

The Nevada Traverse, Vol. 45, No. 3, “The Grey Area Surrounding NV Recording Laws”

The Nevada Traverse, Vol. 46, No. 1, “The Four-Year Degree and the Future of Land Surveying”

BIOGRAPHY – Steve Parrish, PLS – Retired 2016

Steve began surveying with the U.S. Forest Service in 1963, acquired his Utah PLS in 1973 and worked in a variety of land surveying positions with the USFS through 1984. In early 1985 he began working for the U.S. Bureau of Land Management and eventually served as the BLM Nevada Cadastral Chief. Steve left the government in late 1995 to pursue private surveying experience. He is licensed in 8 western states, a Nevada water rights surveyor and provided contract county surveyor services for Inyo, Modoc and Mono Counties in California from 1999-2012. Steve is one of the contributors to *“The Surveying Handbook”* edited by Brinker and Minnick, has presented workshops in 27 States and Canada, and was an instructor for the BLM/FS Advanced Cadastral Survey Courses for 12 years.

Steve shares his 51+ years of land surveying knowledge and experience through participation in state association land surveying workshops, consulting, and expert witness testimony. He worked for Tri State Surveying in Sparks, Nevada from 1999-2012, is an adjunct professor in the 4-year survey program for Great Basin College (Elko, NV), acquired his Certified Federal Surveyor (CFedS) certificate in 2007 and received his Bachelor of Applied Science degree in May 2009. He is active in state and national surveying organizations and enjoys travel with his family, photography and fishing.

Continuing education classes taught by Steve Parrish

- CSI – Corner Site Investigation (Forensics of Surveying)
- Double Monumentation – Physical and Inferred
- The Hunt for an Illusive 1872 Patented Placer Claim
- IBLA – Interior Board of Land Appeals
- Private–Federal Boundaries (A Suburban Challenge)
- Reclamation Act of 1902 (Surveys and Their Impact)
- Rectangular Irregularities and Descriptive Discrepancies
- Research – Recovery – Remonumentation – Recordation Restoration of Lost or Obliterated Corners – 2009 Manual Chapters V, VI, and VII Role of Wood Evidence in the PLSS
- Surveying the Comstock (MS, PLSS, Townsites and County Lines)
- To Accept or Not To Accept...That is the Question
- The Surveyor in Court
- Unconventional Surveys Within the Rectangular System (HES, MS)
- Walking in the Footsteps (of Previous Surveyors)

BIOGRAPHY – Byron Johnson, PLS – Retired 2018

Education:

Texas State Technical College
Waco, TX US

Associate degree - 05/1981

Major: Civil/Surveying

Relevant Coursework, Licensures and Certifications:

Licensed PLS in Nevada, Arizona, Idaho, and Washington.

Nevada Water-Rights Surveyor. Certified Federal Surveyor.

Work Experience:

GCDB Manager - Perform GCDB compilation of data to include research of cadastral field notes and plat's, calculation of data and preparation of completed data for posting on the GCDB website utilizing WinGMM, Data Prep and ArcMap.

Owner/Professional land surveyor specializing in retracement of early contract, historical and cadastral surveys, topographic surveys, GPS and GIS control networks. Maintained my business while in the employment of private and public entities.

(2005-2006) Provided as needed GPS control and mapping on possible hazardous spoil at mining sites for the Bureau of Reclamation and EPA. Provided GPS mapping control for City of Reno on Silver Lake and Swan Lake.

(2004-2005) Supervised (5 crews) and participated in the GPS establishment of the control and network for the Southern Nevada Water Authority Geodetic control network from Las Vegas, NV north to Cherry Creek, NV and from the NV-Utah border west to Highway 6. Including interaction with land owners and local government entities, logistics and coordination of lodging, access routes and per diem.

Nevada System of Higher Education

Past Program Chair and adjunct instructor for the Survey Program at the then College of Southern Nevada (1993-2003),

Adjunct instructor for surveying courses at UNLV (1998-2000), UNR (2005, 2007-2009) GBC (2007-Present).

Courses established or instructed included:

- Surveying 1 and 2,
- Civil-Surveying,
- Advanced Surveying,
- Legal Aspects of Surveying,
- Writing and Advanced Land Descriptions.
- Seminars instructed: Boundary Control, Advanced Boundary Control, Easement Interpretation, GPS Field/Office/ and Software Applications, Lots-Blocks and Deeds, Surveying Office and Field Procedures, Junior /Senior rights within Simultaneous created Parcels and others.

Analysis of GBC Student Statistical Data

Part of GBC’s mission is to prepare students for direct entry to immediate job opportunities, as well as obtaining various degrees for further studies through earning certificates, associates, and baccalaureate degrees. The 2017-2018 Graduate Survey results are reported below for all graduates together and by award level. Students graduated in 2017- 2018 and were surveyed in summer 2019 and asked to evaluate their satisfaction with their learning outcomes, GBC services, and their education. Graduates obtaining nursing and radiology technology degrees do not use this graduate survey. There were 363 graduates that were surveyed, and 130 graduates responded. This is a 36% response rate.

GBC 2017- 2018 Graduate Survey

The social environment at GBC is conducive to personal growth.	54% Agree or Strongly Agree
I feel that the time I spent at GBC was a wise use of my time.	85% Agree or Strongly Agree
GBC prepared me to continue my education.	78% Agree or Strongly Agree
I will recommend GBC to others interested in the same major field of study.	84% Agree or Strongly Agree
I achieved my educational objective either partially or fully.	95% Agree or Strongly Agree
All, in all, if I had to do it all over again, I would enroll at GBC.	83% Agree or Strongly Agree

Source: <https://www.gbcnv.edu/IR/reports.html#2017-2018>

GBC Fall 2018 Student Satisfaction Survey Results

Introduction and Methodology

In Fall 2018, all degree or certificate-seeking students enrolled at Great Basin College were asked to participate in a 20 minute, online student satisfaction survey administered by Noel-Levitz, Inc. where they were asked to rank approximately 70 questions in both importance and satisfaction using a Likert scale from 1 to 7 with 7 being the highest score. Students were emailed an initial invitation to participate on Oct. 29 and were told that four of the respondents would be randomly selected to receive a \$25 gift certificate from the GBC Bookstore. Five additional emails were sent through Nov. 29, 2018 and the survey instrument was closed on Dec. 3. The Noel-Levitz Student Satisfaction Inventory for two-year institutions was used so we could compare student satisfaction with GBC in Fall 2018 with the results received from the same survey instrument in Fall 2016 as well as with the results of all students taking the survey nationally.

Overall Summary of Results

Overall, students are quite satisfied with GBC. GBC students have statistically significant higher satisfaction rates than those nationally in every major scale. There is no statistically significant difference in mean overall satisfaction on summary level items, but the combined percentages of students responding in the highest categories, indicate that students are happier at GBC.

Noel-Levitz provides us with a list of Strengths and Challenges for GBC overall. The Strengths are highly valued by students and GBC does them well. These items are in the top 50% as ranked by students for importance and top 75% as ranked for satisfaction.

Strengths

1. The campus is safe and secure for all students.
2. Nearly all of the faculty are knowledgeable in their fields.
3. My academic advisor is knowledgeable about my program requirements.
4. My academic advisor is approachable.
5. Program requirements are clear and reasonable.
6. Admissions staff are knowledgeable.
7. I am able to experience intellectual growth here.
8. Campus item: Online registration is convenient
9. I am able to register for classes I need with few conflicts.
10. There are convenient ways of paying my school bill.
11. On the whole, the campus is well-maintained.
12. Students are made to feel welcome on this campus.
13. The personnel involved in registration are helpful.
14. Computer labs are adequate and accessible.
15. It is an enjoyable experience to be a student on this campus.
16. Tutoring services are readily available.
17. Class change (drop/add) policies are reasonable.
18. The business office is open during hours which are convenient for most students.
19. The campus staff are caring and helpful.

The challenges are identified areas for improvement. Students care about them, but their expectations are not met. These items are in the top 50% as ranked by importance, but the bottom 25% as ranked by satisfaction or the top 75% as ranked by performance gap which is the difference between importance and satisfaction ratings. These items should be actively reviewed and discussed across GBC. <https://www.gbcnv.edu/IR/reports.html#2017-2018>

Challenges

1. The quality of instruction I receive in most of my classes is excellent.
2. Faculty provide timely feedback about student progress in a course.
3. Administrators are approachable to students.
4. There is a good variety of courses provided on this campus.
5. Adequate financial aid is available for most students.
6. Classes are scheduled at times that are convenient for me.
7. Admissions counselors respond to prospective students' unique needs and requests.
8. This school does whatever it can to help me reach my educational goals.

GBC Campus Demographic Data

Gender	N	%
Female	201	73.90%
Male	71	26.10%
Total	272	100.00%
No Response	75	

Age	N	%
18 and under	78	26.53%
19 to 24	68	23.13%
25 to 34	62	21.09%
35 to 44	53	18.03%
45 and over	33	11.22%
Total	294	100.00%
No Response	53	

Ethnicity/Race	N	%
African American	6	1.92%
American Indian or Alaskan Native	11	3.51%
Asian or Pacific Islander	14	4.47%
Caucasian/White	185	59.11%
Hispanic	62	19.81%
Other race	12	3.83%
Race - Prefer not to respond	23	7.35%
Total	313	100.00%
No Response	34	

Current Enrollment Status	N	%
Day	219	69.30%
Evening	84	26.58%
Weekend	13	4.11%
Total	316	100.00%
No Response	31	

Current Class Load	N	%
Full-time	158	52.49%
Part-time	143	47.51%
Total	301	100.00%
No Response	46	

Class Level	N	%
1 year or less	135	44.70%
2 years	70	23.18%
3 years	44	14.57%
4 or more years	53	17.55%
Total	302	100.00%
No Response	45	

Current GPA	N	%
No credits earned	31	9.63%
1.99 or below	5	1.55%
2.0 - 2.49	22	6.83%
2.5 - 2.99	40	12.42%
3.0 - 3.49	95	29.50%
3.5 or above	129	40.06%
Total	322	100.00%
No Response	25	

Educational Goal	N	%
Associate degree	159	49.69%
Vocational/technical program	12	3.75%
Transfer to another institution	29	9.06%
Certification (initial / renewal)	19	5.94%
Self-improvement/pleasure	10	3.13%
Job-related training	14	4.38%
Other educational goal	77	24.06%
Total	320	100.00%
No Response	27	

Employment	N	%
Full-time off campus	113	34.14%
Part-time off campus	79	23.87%
Full-time on campus	13	3.93%
Part-time on campus	24	7.25%
Not employed	102	30.82%
Total	331	100.00%
No Response	16	

Current Residence	N	%
Residence hall	18	5.50%
Own house	117	35.78%
Rent room or apt off campus	50	15.29%
Parent's home	115	35.17%
Other residence	27	8.26%
Total	327	100.00%
No Response	20	

Residence Classification	N	%
In-state	273	89.51%
Out-of-state	29	9.51%
International (not U.S. citizen)	3	0.98%
Total	305	100.00%
No Response	42	

Disabilities	N	%
Yes - Disability	25	8.59%
No - Disability	266	91.41%
Total	291	100.00%
No Response	56	

Institution Was My	N	%
1st choice	224	70.66%
2nd choice	68	21.45%
3rd choice or lower	25	7.89%
Total	317	100.00%
No Response	30	

List the location (or Internet) where you take the majority of your classes

	N	%
Elko	142	44.79%
Ely	7	2.21%
Internet	102	32.18%
Pahrump	28	8.83%
Winnemucca	14	4.42%
Other Locations	24	7.57%
Total	317	100.00%
No Response	30	

Group Code	N	%
1011: Other Not Listed-Health Sciences and Human Services	14	4.29%
1012: Social Sciences	16	4.91%
1013: Business	30	9.20%
1014: Education	47	14.42%
1015: Other Not Listed-Career and Technical Education	7	2.15%
1016: Science or Agriculture	26	7.98%
1017: Other	47	14.42%
1018: Undecided	23	7.06%
1019: Computer Technologies	17	5.21%
1020: Transfer	10	3.07%
1021: Paramedic	5	1.53%
1022: Radiology Technology	10	3.07%
1023: Nursing AAS	17	5.21%
1024: Nursing BSN	14	4.29%
1025: Human Services	17	5.21%
1026: Diesel Technology	5	1.53%
1027: Electrical Systems Technology	9	2.76%
1028: Industrial Millwright Technology	5	1.53%
1029: Instrumentation Technology	3	0.92%
1030: Welding Technology	4	1.23%
Total	326	100.00%
No Response	21	

Appendix A

2015-2019 LSG Program BAS Graduate Survey

- Total Number of Responses: 13
- Total Number of Graduates : 27 (each sent one email)
- Response Rate: 48%
- Methods of Contacting Students: email
- Number of students employed: 13
- Number of students not employed: 0
- Employment rate of students that replied to survey: 100%
- Average years of surveying experience: 11-15 years
- Average pass rate (2015-2019) for NCEES LSIT exam 90%

Academic Expectations	2014	2019
What is your perception of the academic expectations of your department or program?	N=13	N=13
1= Low or Poor	1	0
2 = Below Average	0	1
3 = Average	2	2
4 = Above Average	5	6
5 = High or Excellent	5	4
Mean = Above Average	4.00	4.00
Keeping pace with recent trends		
How would you rate your program's performance in keeping pace with recent trends and developments in your field?	N=13	N=13
1= Low or Poor	1	0
2 = Below Average	3	1
3 = Average	3	3
4 = Above Average	5	4
5 = High or Excellent	1	5
Mean = Above Average	3.15	4.00
Supervision and Guidance		
Indicate your level of satisfaction with the supervision and guidance you received.	N=13	N=13
1= Low or Poor	1	1
2 = Below Average	1	1
3 = Average	3	2
4 = Above Average	3	5
5 = High or Excellent	5	4
Mean = Average	3.77	3.77

Quality of the faculty		
What is your perception of the quality of the faculty in your degree program?	N=13	N=13
1= Low or Poor	0	1
2 = Below Average	1	0
3 = Average	2	2
4 = Above Average	5	5
5 = High or Excellent	5	5
Mean = Above Average	4.08	4.00
Quality of your degree program?		
How would you rate the overall quality of your degree program?	N=13	N=13
1= Low or Poor	0	0
2 = Below Average	1	1
3 = Average	1	1
4 = Above Average	6	7
5 = High or Excellent	5	4
Mean = Above Average	4.15	4.08
Affordability		
How important is affordability (Cost Per Credit)	N=13	N=13
1 = Not Important	3	2
2 = Important	5	4
3 = Very Important	5	7
Mean = Important	2.15	2.38
Proximity		
Rate the importance of your proximity to Elko, NV	N=13	N=13
1 = Not Important	11	11
2 = Important	0	0
3 = Very Important	2	2
Mean = Not Important	1.31	1.31
Support Services		
Rate the importance of Student Support Services offered at GBC	N=13	N=13
1 = Not Important	6	6
2 = Important	5	3
3 = Very Important	2	4
Mean = Not Important	1.69	1.85

Accessibility		
Rate the importance of accessibility (Online Classes) offered at GBC	N=13	N=13
1 = Not Important	1	1
2 = Important	2	1
3 = Very Important	10	11
Mean = Important	2.69	2.77
Instructor Accessibility		
Rate the importance of accessibility to your instructors at GBC	N=13	N=13
1 = Not Important	1	1
2 = Important	8	5
3 = Very Important	4	7
Mean = Important	2.23	2.46
Quality of Instruction		
How important is quality instruction to you	N=13	N=13
1 = Not Important	2	0
2 = Important	4	5
3 = Very Important	7	8
Mean = Important	2.38	2.62
Program Reputation		
How important is program reputation to you	N=13	N=13
1 = Not Important	2	0
2 = Important	6	7
3 = Very Important	5	6
Mean = Important	2.23	2.46
State Requirement for Licensure		
Rate the importance a BAS degree has for state licensure	N=13	N=13
1 = Not Important	2	2
2 = Important	2	1
3 = Very Important	9	10
Mean = Important	2.54	2.62
Associate Degree		

State the importance of earning an Associate Degree	N=13	N=13
1 = Not Important	7	9
2 = Important	3	4
3 = Very Important	3	0
Mean = Not Important	1.69	1.31
Bachelor Degree		
State the importance of earning a Bachelor Degree	N=13	N=13
1 = Not Important	0	0
2 = Important	1	0
3 = Very Important	12	13
Mean = Very Important	2.92	3.00
Student Loans		
Please estimate the amount you currently owe for student loans.	N=13	N=13
1 = No debt	8	8
2 = Less than \$5,000	0	1
3 = \$5,000-9,999	1	0
4 = \$10,000-14,999	0	0
5 = \$15,000-19,999	0	0
6 = \$20,000-24,999	2	0
7 = \$25,000-29,999	2	1
8 = \$30,000 or more	0	1
Mean = Less than \$5,000	2.84	1.92
Annual Mean Wage		
Please estimate the amount you currently earn per year.	N=13	N=13
1 = Unemployed	0	N/A
2 = \$0 - 25,000	1	N/A
3 = \$25,001 - 50,000	3	N/A
4 = \$50,001 - 75,000	4	N/A
5 = \$75,001 or more	5	N/A
Mean = N/A	4	N/A
Years of Surveying Related Experience		
Please estimate the amount of surveying related experience you have.	N=13	N=13
1 = 1-5	4	2
2 = 6-10	4	3
3 = 11-15	3	0

4 = 16-20	1	5
5 = 20+	1	3
Mean = 11-15	2.31	3.31
Fundamentals of Surveying Examination		
Have you taken the (NCEES) Fundamentals of Surveying Examination?	N=13	N=13
Yes, did not pass.	0	1
Yes, passed.	9	9
No	3	3
Not Required	1	0
100% Pass Rate, 75% Participation Rate	100%	90%
Current Professional Status		
Please estimate the amount of surveying related experience you have.	N=13	N=13
Student	0	0
GIS	0	0
Survey Tech	4	1
LSIT	5	3
Engineer	1	1
LS	3	8
Owner of Firm	2	4
Graduation Year	N=13	N=13
2009 2015	1	5
2010 2016	1	2
2011 2017	2	0
2012 2018	2	2
2013 2019	2	4
2014 N/A	5	0

Summary of 2015-2019 Surveying BAS Graduate Program Survey

1. How would you rate the overall quality of your degree program?
2. What is your perception of the academic expectations of your department or program?
3. How would you rate your program's performance in keeping pace with recent trends and developments in your field?
4. What is your perception of the quality of the faculty in your degree program?
5. Indicate your level of satisfaction with the supervision and guidance you received.

Topic	2009-2014 Graduates	N = 13	2015-2019 Graduates	N = 13
Quality of your degree program?	4.15	Above Average	4.08	Above Average
Academic Expectations	4.00	Above Average	4.00	Above Average
Keeping pace with recent trends	3.15	Average	4.00	Above Average
Quality of the faculty	4.08	Above Average	4.00	Above Average
Supervision and Guidance	3.77	Average	3.77	Average

1 = Low or Poor 2 = Below Average 3 = Average 4 = Above Average 5 = High or Excellent

1. State the importance of earning a Bachelor's Degree.
2. Rate the importance of accessibility (Online Classes) offered at GBC.
3. Rate the importance a BAS degree has for state licensure.
4. How important is quality instruction to you?
5. How important is program reputation to you?
6. Rate the importance of accessibility to your instructors at GBC.
7. How important is affordability (Cost Per Credit)?
8. Rate the importance of Student Support Services offered at GBC
9. Rate the importance of your proximity to Elko, NV.
10. State the importance of earning an Associate Degree.

Topic	2009-2014 Graduates	N = 13	2015-2019 Graduates	N = 13
Bachelor's Degree	2.92	Important	3.00	Very Important
Accessibility	2.69	Important	2.77	Important
State Requirement for Licensure	2.54	Important	2.62	Important
Quality of Instruction	2.38	Important	2.62	Important
Program Reputation	2.23	Important	2.46	Important
Instructor Accessibility	2.23	Important	2.46	Important
Affordability	2.15	Important	2.38	Important
Support Services	1.69	Not Important	1.85	Not Important
Proximity	1.31	Not Important	1.31	Not Important
Associate Degree	1.69	Not Important	1.31	Not Important

1 = Not Important 2 = Important 3 = Very Important