Curriculum and Articulation Committee Faculty Senate Report and Action Items

April 17, 2015

The Curriculum and Articulation Committee met on April 6 from 10:00 a.m. to 12:00 p.m.
The committee approved and requests a Faculty Senate vote on following items:

Course	Description
1. MATH 126E	New Course Course Title: Precalculus I Expanded Catalog description: A third course in algebra, intended for those who are majoring in a science field, business related field, or mathematics; as part of a mathematics endorsement for elementary education; or for students who are going on to calculus. This course stresses functions, including their graphs and applications, polynomial functions, radicals, rational functions, exponential and logarithmic functions. This course also contains a review of topics from Intermediate Algebra, including, but not limited to polynomials and factoring, rational expressions, rational exponents, and radical expressions. This is the first half of a two semester sequence. MATH 126 and MATH 127 together, or MATH 128 and STAT 152 together satisfy the mathematics requirement for an Associate of Science degree. This course satisfies the College Algebra requirement for programs that require College Algebra and Statistics. It is recommended that students have completed prerequisites within two years of enrolling in this course. This is a 5 credit bridge course. Only three of the credits are applicable to the math general education requirement; the other two credits will be classified as electives. Prerequisite: Must have completed Math 95 with a grade of B or better, earned an SAT score of 480-495, an ACT score of 20, 21,or Accuplacer score of 80 on elementary algebra and 30-54 on college level mathematics.
2. MATH 126	Course Revision (catalog description change) Course Title: Precalculus I Current catalog description: A third course in algebra, intended for those who are majoring in a science field, a business-related field, or mathematics; as part of a mathematics endorsement for elementary education; or for students who are going on to calculus. This course stresses functions, including their graphs and applications, polynomial functions, radicals, rational functions, exponential, and logarithmic functions. This is the first half of a

	two-semester sequence. MATH 126 and MATH 127 together, or MATH 126 and STAT 152 together, satisfy the mathematics requirement for an Associate of Science degree; also see the bachelor's degree requirements. This course satisfies the College Algebra requirement for programs that require College Algebra and Statistics. It is recommended that students have completed prerequisites within two years of enrolling in this course. Prerequisite: Must have completed MATH 96 or MATH 97 or earned a satisfactory score in Accuplacer, ACT, or SAT tests for placement into MATH 126 or MATH 128. Proposed catalog description: A third course in algebra that stresses polynomial, rational, quadratic, exponential, and logarithmic functions, including their graphs and applications; complex numbers; systems of linear inequalities and linear equations; and matrices. Prerequisite: Must have completed MATH 96 or MATH 97 or earned a satisfactory score in Accuplacer, ACT, or SAT tests for placement into MATH 126 or MATH 128.
3. Math 127	Course Revision (catalog description change) Course Title: Precalculus II Current catalog description: A course intended for those majoring in a science field or mathematics, as part of a mathematics endorsement for elementary education, or for students going on to calculus. Topics include circular functions, their graphs, and applications; trigonometric identities and equations; conic sections; complex numbers; matrices; sequences and mathematical induction. This is the second half of a two-semester sequence. The two semesters satisfy the mathematics requirement for a bachelor's degree. The two-course sequence, MATH 126 and MATH 127, are equivalent to MATH 128 at UNR or UNLV. It is recommended that students have completed prerequisites within two years of enrolling in this course. Prerequisite: Must have completed MATH 126 or earned a satisfactory score in Accuplacer, ACT, or SAT test for placement into MATH 127. Proposed catalog description: Topics include circular functions, their graphs, and applications; trigonometric identities and equations; conic sections; vectors; sequences and mathematical induction. Prerequisite: Must have completed MATH 126 or earned a satisfactory score in Accuplacer, ACT, or SAT test for placement into MATH 127.
4. EMS 204B	New Course Course Title: “Principles of Anatomy & Pathophysiology”

	EMS 204B Principles of Anatomy & Pathophysiology (New course) Proposed catalog description: This course prepares the student to understand basic medical terminology, microscopic and gross anatomy and physiology. The course is designed to go beyond what is covered in the anatomy and physiology review of each section in the national standard curriculum. This course will be offered for 4 credits (3 credits of Lecture 1 credit of Skills Lab). Prerequisite: Acceptance to the Paramedic Program
5. EMS 206B	Course Revision (catalog description change and credit change) and Reactivation Course Title: Principles of Pharmacology/Medication &Venous Access for the Paramedic Existing Credits: 5 Proposed Credits: 3-4 Existing Catalog Description: Course prepares the student to understand and be able to integrate the principles of pathophysiological pharmacology and the assessment findings to formulate a field impression and implement a pharmacologic management plan for patients in the prehospital environment. Course also introduces the student to venous access, IV therapy, medication administration, and drug calculation. (60 hours lecture; 15 hours lab). Offered in Fall Semester only. Prerequisite: Must have completed EMS 205. This course cannot be used for an Associate of Arts (A.A.), Associate of Science (A.S.), or a Bachelor of Arts (B.A.) degree, and may not be transferable for other baccalaureate degrees in Nevada. Proposed Catalog Description: This course prepares the student to understand and to be able to integrate the principles of pathophysiological pharmacology and the assessment findings to formulate a field impression and implement a pharmacologic management plan for patients in the prehospital environment. This course will be offered for 4 credits (3 credits of *Lecture/1* credit Lab). Prerequisite: Acceptance to the Paramedic Program.
6. EMS 207B	Course Revision (catalog description change and credit change)m and Reactivation Course Title: Airway Management an Ventilation for Paramedics Existing Credits: 1.5 Proposed Credits: 2

	Existing Catalog Description: Students successfully completing this course will demonstrate a behavioral, cognitive, and psychomotor understanding of, and proficiency with, basic and advanced airway management.(7.5 hours lecture; 15 hours lab) Prerequisite: Must have completed EMS 206. Instructor consent required. This course cannot be used for an Associate of Arts (A.A.), Associate of Science (A.S.), or a Bachelor of Arts (B.A.) degree, and may not be transferable for other baccalaureate degrees in Nevada. Proposed Catalog Description: Students successfully completing this course will demonstrate a behavioral, cognitive, and psychomotor understanding of, and proficiency with, basic and advanced airway management. This course will be offered for 2.0 credits (1 credit *theory/1* credit lab). Prerequisite: EMS 204B, EMS 206B.
7. EMS 209B	Course Revision (catalog description change and credit change) and Reactivation Course Title: Patient Assessment for Paramedics Existing Credit: 2.5 Proposed Credit: 2-3 Existing Catalog Description: Introduces the paramedic student to a comprehensive physical examination and assessment, which includes history taking, clinical decision making, communications, and documentation.(15 hours lecture; 22 hours lab). Prerequisite: Must have completed EMS 207. Instructor consent required. This course cannot be used for an Associate of Arts (A.A.), Associate of Science (A.S.), or a Bachelor of Arts (B.A.) degree, and may not be transferable for other baccalaureate degrees in Nevada. Proposed Catalog Description: This course introduces the Paramedic student to a comprehensive physical examination and assessment, which includes history taking, clinical decision-making, communications, and documentation. This course will be offered for 2.0 credits (1 credit theory/1 credit lab). Prerequisite: EMS 204B, EMS 206B.
8. EMS 210B	Course Revision (catalog description change and credit change) and Reactivation Course Title: Principles of Cardiology for Paramedics

	Existing Credit: 4 Proposed Credit: 3 Existing Catalog Description: Prepares the paramedic student to identify single and multi-lead cardiac rhythms and treats those rhythms considered to be life-threatening with electrical therapy. Skills taught include defibrillation, cardioversion, and cardiac rhythm interpretation. Also prepares the student to assess, manage, and treat various cardiovascular emergencies that include ventricular fibrillation, bradycardia, tachycardia, myocardial infarction, cardiogenic shock, pulmonary edema, angina pectoris, congestive heart failure, hypertension, PEA (pulseless electrical activity), and asystole. (30 hours lecture; 30 hours lab). Prerequisite: Must have completed EMS 209. Instructor consent required. This course cannot be used for an Associate of Arts (A.A.), Associate of Science (A.S.), or a Bachelor of Arts (B.A.) degree, and may not be transferable for other baccalaureate degrees in Nevada. Proposed Catalog Description: This course prepares the Paramedic student to identify single and multi-lead cardiac rhythms and treat those rhythms considered to be life-threatening with electrical therapy. The skills taught include defibrillation, cardioversion, and cardiac rhythm interpretation. It will also prepare the student to assess, manage, and treat various cardiovascular emergencies that includes ventricular fibrillation, bradycardia, tachycardia, myocardial infarction, cardiogenic shock, pulmonary edema, angina pectoris, congestive heart failure, hypertension, PEA (pulseless electrical activity), and asystole. This course will be offered for 3 credits (2 theory/1 lab). Prerequisite: EMS 204B, EMS 205B.
9. EMS 211B	Course Revision (catalog description change and credit change) and Reactivation Course Title: Paramedic Care for Medical Emergencies and ACLS Existing Credit: 7 Proposed Credit: 4 Existing Catalog Description: Prepares the paramedic to identify, assess, manage, and treat various medical emergencies. Topics include neurology, endocrinology, allergies and anaphylaxis, gasteroenterology, urology, toxicology, environmental conditions, infectious and communicable diseases, behavioral and psychiatric disorders, gynecological and obstetrical emergencies, and associated pharmacological interventions. (ACLS) is designed for

	healthcare providers who either direct or participate in the resuscitation of the patient, whether in the prehospital or hospital setting. The course will enhance skills in the treatment of arrest and peri-arrest patients through active participation in a series of simulated cardiopulmonary cases. (75 hours lecture; 30 hours lab). Prerequisite: Must have completed EMS 210. Instructor consent required. This course cannot be used for an Associate of Arts (A.A.), Associate of Science (A.S.), or a Bachelor of Arts (B.A.) degree, and may not be transferable for other baccalaureate degrees in Nevada. Proposed Catalog Description: This course prepares the Paramedic to identify, assess, manage, and treat various medical emergencies. Topics include Neurology, Endocrinology, Allergies and Anaphylaxis, Gasteroeneterology, Urology, Toxicology, Environmental Conditions, Infectious and Communicable Diseases, Behavioral and Psychiatric Disorders, Gynecological and Obstetrical Emergencies, and associated pharmacological interventions. This course will be offered for 4 credits (3 credits of Lecture/ 1 credit of Skills Lab). Prerequisite: EMS 204B, EMS 206B.
10. EMS 212B	Course Revision (catalog description change and credit change) and Reactivation Course Title: Paramedic Trauma Emergencies and International Trauma Life Support (ITLS) Existing Credit: 5.5 Proposed Credit: 3-4 Existing Catalog Description: Prepares the student to identify, assess, manage, and treat various types of trauma emergencies. Topics include trauma systems; mechanism of injury; soft-tissue trauma; burns, head and face trauma; spinal trauma; thoracic trauma; abdominal trauma; and musculoskeletal trauma. Skills include trauma assessment, splinting, bandaging, spinal immobilization, IV therapy, chest decompression, and associated pharmacological interventions. The international trauma life support (ITLS) portion of the course is designed to teach students the skills necessary to recognize mechanisms of injury, assess, perform critical interventions, package, and fundamental knowledge and experiences necessary to get the trauma patient to the emergency department. A major focus of the course is the identification of conditions that require immediate transport in order to save the patient. Lifesaving techniques are taught or reviewed in practical exercises. 4.5 lecture; 1.0 lab. Prerequisite: Must have completed EMS 211. Instructor consent required. This

	course cannot be used for an Associate of Arts (A.A.), Associate of Science (A.S.), or a Bachelor of Arts (B.A.) degree, and may not be transferable for other baccalaureate degrees in Nevada. Proposed Catalog Description: This course prepares the student to identify, assess, manage, and treat various types of trauma emergencies. Topics include Trauma Systems, Mechanism of Injury, Soft· Tissue Trauma, Bums, Head and Face Trauma, Spinal Trauma, Thoracic Trauma, Abdominal Trauma, and Musculoskeletal Trauma. Skills include trauma assessment, splinting, bandaging, spinal immobilization, IV therapy, chest decompression, and associated pharmacological interventions. This course will be offered for 4 credits (3 *theory/1* lab). Prerequisites: EMS 207B, EMS209B, EMS 210B, EMS 211B.
11. EMS 214B	Course Revision (title change and catalog description change) and Reactivation Existing course Title: Pediatrics and Special Consideration Proposed Course Title: Pediatrics and Special Considerations for the Paramedic and Pals Credit: 3 Existing Catalog Description: Prepares paramedic to identify, assess, manage, and treat age related emergencies and other special challenges. Introduces the concept of assessment based management. Topics include neonatology, pediatrics, geriatrics, abuse and assault, and patients with special challenges. 30 hours of lecture and 15 hours of lab. Prerequisite: Must have completed EMS 212. Instructor consent required. This course cannot be used for an Associate of Arts (A.A.), Associate of Science (A.S.), or a Bachelor of Arts (B.A.) degree, and may not be transferable for other baccalaureate degrees in Nevada. Proposed Catalog Description: This course prepares the Paramedic to identify, assess, manage, and treat age related emergencies, and other special challenges. The student will also be introduced to the concept of assessment based management. Topics include Neonatology, Pediatrics, Geriatrics, Abuse and Assault, and Patients with Special Challenges. Prerequisite: EMS 216B, EMS 211B, EMS 210B, EMS 209B, EMS 207B, EMS 206B, EMS 204B.
12. EMS 215B	Course Revision (catalog description change) and Reactivation Course Title: Assessment Based Management and Operations for the Paramedic

	Credit: 3 Existing Catalog Description: Contains the principles of Assessment Based Management that will teach the paramedic student how to implement a plan for patients with common complaints. Prepares the Paramedic to the concepts of medical incident command, ambulance and rescue operations, hazardous materials, incident, and crime scene awareness. Prerequisite: Must have completed EMS 214. Instructor consent required. Instructor consent required. This course cannot be used for an Associate of Arts (A.A.), Associate of Science (A.S.), or a Bachelor of Arts (B.A.) degree, and may not be transferable for other baccalaureate degrees in Nevada. Proposed Catalog Description: This course will contain the principles of Assessment Based Management that will teach the paramedic student how to implement a plan for patients with common complaints. The course will also prepare the Paramedic to the concepts of medical incident command, ambulance and rescue operations, hazardous materials, incident, and crime scene awareness. Prerequisite: EMS 216B, EMS 211B, EMS 210B, EMS 209B, EMS 207B, EMS 206B, EMS 204B.
13. EMS 216B	Course Revision (catalog description change and credit change) and Reactivation Course Title: Hospital Clinical Experience for the Paramedic Existing Credit: 4 Proposed Credit: 5.5 Existing Catalog Description: Allows the paramedic student to apply learned classroom skills and knowledge in the hospital and other clinical care environments. The student will function under the direction of a nurse or physician preceptor. 248 clinical hours. [P/W] Prerequisite: Must have completed EMS 210. Instructor consent required. This course cannot be used for an Associate of Arts (A.A.), Associate of Science (A.S.), or a Bachelor of Arts (B.A.) degree, and may not be transferable for other baccalaureate degrees in Nevada. Proposed Catalog Description: This course allows the paramedic student to apply learned classroom skills and knowledge in the hospital and other clinical care environments. The student will function under the direction of a nurse or physician preceptor. This course will be offered for 4 credits (45 hours per credit =180 clinical hours). Prerequisite: EMS 207B, EMS 209B, EMS 210B, EMS

	211B.
14. EMS 219B	Course Revision (catalog description change and credit change) and Reactivation Course Title: Paramedic Field Internship Existing Credit: 6 Proposed Credit: 5.5 Existing Catalog Description: Designed to introduce the paramedic student to Advanced Life Support (ALS) pre-hospital operations. The student will also become familiar with procedures and care provided by paramedics in the field. Each student will be a third person on a paramedic rescue unit and will work directly with a paramedic preceptor. 270 field hours. [P/W] Prerequisite: Must have completed EMS 215. Instructor consent required. This course cannot be used for an Associate of Arts (A.A.), Associate of Science (A.S.), or a Bachelor of Arts (B.A.) degree, and may not be transferable for other baccalaureate degrees in Nevada. Proposed Catalog Description: This course is designed to introduce the paramedic student to Advanced Life Support (ALS) prehospital operations. The student will also become familiar With procedures and care provided by paramedics in the field. Each student will be a third person on a paramedic rescue unit and will work directly with a paramedic preceptor. Prerequisite: EMS 215B, EMS 214B, EMS 212B, EMS 216B, EMS 211B, EMS 210B, EMS 209B, EMS 207B, EMS 206B, EMS 204B.
15. A.S. (Land Surveying and Geomatics emphasis)	New Degree Program Emphasis Please see attached program proposal.

Information Item

	Description
PEX 199	"Pi-Yo: Pilates/Yoga" will be offered for two credits under PEX 199 "Special Topics" in Fall 2015

ACADEMIC PROGRAM PROPOSAL FORM

DIRECTIONS: *Use this form when proposing a new major or primary field of study, new emphasis, or new degree program.*

DATE SUBMITTED: 04/06/2015

Date of AAC Approval:

INSTITUTION: Great Basin College

REQUEST TYPE:

☐ New Degree
☐ New Major or Primary Field of Study
☒ New Emphasis

Date of Board Approval:

DEGREE (i.e. Bachelor of Science):

MAJOR (i.e. Animal Science):

EMPHASIS (i.e. Equine Studies): Associate of Science Land Surveying and Geomatics

CREDITS TO DEGREE: 61.5

PROPOSED SEMESTER OF IMPLEMENTATION: Fall 2015

Action requested:

A. Brief description and purpose of proposed program

The proposed online Land Surveying/Geomatics (LSG) Associate of Science degree program is 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. Ideally, the proposed Associate of Science degree program will provide firms or agencies that currently hire, sponsor, and develop survey technicians (acclimated to the demands of the workplace), an educational environment that prepares promising survey technicians a path towards licensure by partnering with the online Great Basin College Land Surveying and Geomatics Four Year degree Program.

B. Statement of degree or program objectives

• 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.

C. Plan for assessment of degree or program objectives

The course offerings listed below display the course objectives for the lower-division prerequisites currently required for the completion of the upper-division emphasis requirements in the BAS Land Surveying/Geomatics program. Individual objectives are met by scoring a 70% or higher on formative and summative assessments and by satisfying rubric criteria based on the outcomes of student projects and reports. Courses delivered outside the Land Surveying/Geomatics program may have objective criteria that measure course efficacy on a different scale.

Assessment Matrix for SUR 280: Fundamentals of Geomatics I
Objectives
1. Classify measurement error and adjust random error.
2. Record measurements and correct precision and present calculations for correct precision.
3. Use survey instrumentation to conduct a traverse and compute coordinates using traverse measurements.
4. Obtain spirit-level elevations and conduct peg test.
5. Apply horizontal curve properties and vertical curve properties.
6. Use plan and profile sheet.
7. Define coordinate systems and datums.
8. Discuss role of government agencies in surveying.
9. Format survey data and survey calculations, apply statistics to survey calculations, and maintain field book.
10. Layout an alignment, station the alignment, conduct profile leveling and interpolate contour lines from measured points.

Assessment Matrix for SUR 281: Fundamentals of Geomatics II
Objectives
1. Quantify, compute, eliminate, and manage instrument errors.
2. Apply principles of error propagation and compute precision of measurements.
3. Conduct control leveling using sound survey procedures and standards.
4. Apply principles of survey astronomy to compute accurate directions from measurements on a star.
5. Design accurate large scale mapping surveys to satisfy accuracy standards.
6. Use a data collector for traverse and large scale mapping.

Assessment Matrix for SUR 290: Introduction to Urban Development
Objectives
1. Describe the impact of local government planning and zoning requirements, permitting, and subdivision ordinances on the land development process.
2. Describe the impact of federal and state environmental regulations on land development and construction surveying.
3. Explain the surveyor's responsibilities with respect to state standards of practice, Alta/ACSM Land Title Surveys, and FEMA Elevation Certificates.
4. Define the nomenclature and classifications used to describe different types and patterns of land development.

5. Explain the basic principles of hydrology, storm water drainage, percolation testing, and onsite septic disposal systems.
6. Examine the scope of the typical market analysis and feasibility studies conducted by the land developer.
7. Calculate and determine the catch points in slope staking by the trial and error method, complete route survey design, use of marking stakes, and apply radial stakeout.
8. Apply and compute the basic operations found in construction surveying including grades, foundation layout, gravity pipelines, and topographic mapping.

Assessment Matrix for CADD 121: CAD for Land Surveyors
Objectives
1. Import measured points from field survey.
2. Set up and scale the drawing to accept the imported survey measurements.
3. Apply common CAD commands to create a survey drawing.
4. Create a surface model from an input file of measured survey points.
5. Edit the triangle mesh contained in the surface model.
6. Deploy surface model to create contour lines.
7. Label the contour lines.
8. Implement “elements of best practice’ in the creation of survey plats and maps.

D. Plan for assessment of student learning outcomes and the use of this data for program improvement

The plan to determine the effectiveness and quality of the proposed online Associate of Science Land Surveying/Geomatics program and how it will positively impact student learning and improve program performance is addressed by the following criteria:

1. The alignment of the learning objectives, activities, materials/resources, technology and assessments in the AS LSG.
2. The role technology plays in AS LSG program and how it supports interaction, engagement, and achievement of course learning objectives.

General and non-specific objectives are appropriate for course level goals while specific and detailed objectives are written for individual modules and activities. This understanding helps the designer connect the importance of how “well” designed activities and learning objectives should align for student success. The AS LSG program will adhere to a rather consistent agenda where the learner is required to participate in lecture, complete labs, write reports, read from the text, take quizzes, complete homework assignments, take exams, and complete projects. I provide specific objectives for each activity that align explicitly to Bloom’s taxonomy pillars. Rubrics are incorporated into the assessment process to measure student achievement and the effectiveness of the course material. Addressing student achievement and course objectives builds on the relationship between Bloom’s taxonomy pillars and AS LSG program unit objectives which directly support my teaching style, and fits my instructional design approach, the “Demonstrator.” The goal of the demonstrator is to design course material where activities challenge the learner's ability from just "knowing about" the topic, to "able to do" the topic. Designing material for "able to do" activities requires the instructor to organize the course material, rubrics, and instructions that, when seen from the students' learning viewpoint, are concise and clear.

One strategy the AS LSG program will employ to support student engagement, achievement of course learning objectives, and to ensure access to course components is to convert instructional text-based lab artifacts (that are short and concise; yet lack detailed - technical text) into video screen captures with imbedded audio. This technique supports the different learning modalities (visual, auditory,

kinesthetic, and tactile) and aids in material mastery. Social characteristics such as language and attention span are mitigated for learners that may have a difficult time with English or concentration by affording the learner an opportunity to pause and rewind the lab video. Learners who struggle with auditory learning will find the visual steps useful. Those who have a short alertness span will find the 10-minute screen cast videos desirable. Kinesthetic and tactile learners will also appreciate the short presentation style as these students often possess good eye-hand coordination and enjoy hands on learning; it makes perfect sense that the art and science of surveying and map making will provide these learners with a sense of high self-efficacy. Learners who have limited skills with the surveying and mapping technology will also be supported as they can follow along at their own pace. As I have pointed out above, clearly written instructions and the use of diverse media learning solutions to convey course material will assist students with different learning styles.

The content and components of an online program and individual courses play a vital role in learner success; yet the function and characteristics of the course's online community is often the backbone of the program and provides the catalyst needed for positive student achievement. Strategies or design standards can be incorporated into the course so that the relevant information the community needs to be successful is readably available. The following design considerations will be employed to foster an environment where the AS LSG online community has the opportunity to thrive and grow.

• Comprehensive course schedule: A fully populated course schedule displaying a list of the types of activities, assignments, and assessments the student will engage in during the semester.

• Netiquette: One way to build trust and promote inclusivity is to use the netiquette communication guidelines within the program to help promote positive and thoughtful comments that will allow everyone to feel welcome and comfortable.

• The online learning experience: Without our devices it would be an impossible task to connect with an online community. Without the proper tech skills it is also impossible to connect. In order to achieve a satisfactory comfort level concerning the technology being used; the program course schedule allows a couple of weeks for the learners to acclimate to the program LMS and other technologies found within the program.

• Course participation: As learners participate in different group activities throughout the semester, the instructor should state their expectations related to individual participation. Rubrics should be designed to include the number of posts or the number replies expected and in what format the posts should follow, i.e. APA format. With this rubric in place, the rules and criteria allow the individual learner to competently contribute to the group's knowledge base.

Developing course content for activity assessment reflections, rubrics, web 2.0 tools, discussions and the strategies outlined above; program progress can be measured and improved to successfully assist learners in achieving the described objectives and program outcomes. By carefully following and implementing this content, students enrolled in the AS LSG program develop and learn in an atmosphere where these expectations, interactions, and guidelines dictate and govern the breadth and scope of the online learning community.

E. Contribution and relationship of program objectives to

i. NSHE Master Plan

N/A

ii. Institutional mission

N/A

iii. Campus strategic plan and/or academic master plan

N/A

iv. Department and college plan

The Computer Technologies department's mission statement is simply "Student Success." The Computer Technologies Department is committed to addressing the constantly changing needs of students throughout rural Nevada who are preparing for technology driven careers by improving our methods, techniques, and content for delivering high quality educational experiences. Objectives to help CT 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;

i. continually reviewing, learning, and utilizing new techniques in our individual areas of expertise; and

ii. Developing new classes or revamping older classes to meet the new industry standards as new technologies become accepted practice.

v. Other programs in the institution

None

vi. Other related programs in the System

None

F. Evaluation of need for the program

i. Intrinsic academic value of program within the discipline

GBC's Bachelor degree program in Land Surveying/Geomatics has served Nevada students and distance learners from around the country effectively since its inception in 2005. The Land Surveying/Geomatics program model 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. Approximately 35% of the students enrolled in the current BAS Land Surveying/Geomatics program have not earned an AA - Associate of Arts, AAS-Associate of Applied Science, AS - Associate of Science, BA - Bachelor of Arts, or BS - Bachelor of Science degree. Integrating the existing lower-division prerequisites from the BAS LSG degree along with the general education requirements from the Associate of Science affords learners multiple opportunities to progress in their chosen disciplines. For example, students can articulate into the Land Surveying/Geomatics BAS, transfer to a four-year program in engineering, or pursue a career as a surveying/geomatics field technician. The proposed Associates of Science Land Surveying/Geomatics program, along with the BAS in LSG creates a dual program so flexible that it can accommodate the different needs of state licensure boards, survey firms, licensed land surveyors, working survey technicians, and traditional students. Currently, the web-based curriculum for the LSG BAS degree delivers complete online instruction in 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 entering the two year AS program will 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 Mathlab.

ii. Evidence of existing or projected local, state, regional, national and/or international need for program

The implementation of the Associate of Science in Land Surveying/Geomatics is in response to the growing need for survey technicians in Nevada to capture, store, process, and manage spatial data. This program also acts as a pathway to satisfy the basic and prerequisite educational requirements for licensure required by NRS.625.270 as a professional land surveyor in Nevada. Local and regional businesses, along with state and federal agencies have contacted Great Basin's LSG program with inquiries related to student employment in the field of surveying and mapping. These firms are currently looking for surveying/geomatic technicians to visit sites to record survey measurements and other descriptive data, operate surveying instruments, such as electronic distance-measuring equipment, and collect GPS data on location. Other duties may include: construction staking, searching for previous survey markers, and entering data from surveying instruments into computers, either in the field or in an office.

iii. If this or a similar program already exists within the System, what is the justification for this addition

None

iv. Evidence of employment opportunities for graduates (state and national)

The U.S. Bureau of Labor Statistics, Employment Projections program states: "Employment of surveying and mapping technicians is projected to grow 14 percent from 2012 to 2022, about as fast as the average for all occupations. Recent advancements in mapping technology have led to new uses for maps and a need for more of the data used to build maps. As a result, surveying and mapping technicians are likely to have more work. The digital revolution in mapmaking has created a need to harmonize property maps made the traditional way by making maps based on data fed into a geographic information system (GIS). Owners of private property will need to hire surveyors and surveying technicians to gather data in the field. Cities, towns, and counties are finding that the data gathered by surveying and mapping technicians are crucial in implementing systems integration, which is the process of putting onto one map all the information about wires, pipes, and other underground infrastructure. That way, a city, town, or county can upgrade the entire infrastructure under a street at the same time, and thus have all needed construction done as one project. This coordination of all such construction projects results in savings for the local government."

SOURCE: U.S. Bureau of Labor Statistics, Employment Projections program

v. Student clientele to be served (Explain how the student clientele is identified)

Currently, a recent program survey classified our student clientele into six catagories:

1. Traditional Students: this group contains those individuals without significant survey experience and have just graduated from high school.
2. GIS/Engineer: Geographic Information Science professionals or Engineers who wish to gain more knowledge about surveying and want to pursue the fundamentals of Geomatics.
3. Survey Tech: this group is comprised of working surveyors who are not licensed and would like to gain licensure.
4. LSIT: this group has passed their fundamentals of surveying exam.
5. LS: this group contains licensed land surveyors, but they have no formal post-secondary education.
6. Owner of Firm: as the owner or principal in a survey firm.

Traditional students represent (12%) of the student body and is calculated by combining Student, GIS, and Engineer categories. The Survey Technicians (56%) are the largest segment of our

student population, which is gained by combining LSIT and Survey Techs. Adding the Licensed Surveyor and Owner of Firm classifications together, the second largest population (32%) of our program profile is established. The current student enrollment indicates that 92% 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. Most students bring real-life survey problems to the course to share and discuss.
3. Most students can use their survey experience to analyze and discuss the applicability of survey law and basic concepts.

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 structures is greatly enhanced by survey work experience is often profound.

G. Detailed curriculum proposal

i. Representative course of study by year (options, courses to be used with/without modification; new courses to be developed)

Note: All courses are currently being offered @ GBC

SUGGESTED COURSE SEQUENCE AS—Land Surveying/Geomatics	Credits
FALL—1st Semester (Credits)	
INT 100 GBC Orientation	(0.5)
ENG 101 Composition I	(3)
AST 101 General Astronomy	(3)
ENV 100 Humans and the Environment	(3)
Math 128 Precalculus and Trigonometry	(5)
TOTAL 14.5	

SPRING—2nd Semester (Credits)	
ART 100 Visual Foundations	(3)
ENG 102 Composition II	(3)
GIS 109 Introduction to Geographic Information Systems	(3)
STAT 152 Introduction to Statistics	(3)
PSY 101 General Psychology	(3)
TOTAL 15	

FALL—3rd Semester (Credits)	
SUR 280 Fundamentals of Geomatics I	(4)
PHYS 151 General Physics I	(4)
CADD 121 CAD for Land Surveyors	(3)
HIST 105 European Civilization I to 1648	(3)
TOTAL 14	

SPRING—4th Semester (Credits)	
PSC 101 Introduction to American Politics	(3)
GEOG 103 Physical Geography	(3)
MATH 181 Calculus I	(4)
SUR 281 Fundamentals of Geomatics II	(4)

SUR 290 Introduction to Urban Development (4)
TOTAL 17

Total credits

61.5

ii. Program entrance requirements
None

iii. Program completion requirements (credit hours, grade point average; subject matter distribution, preprogram requirements)
Land Surveying/Geomatics
Associate of Science (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 to articulate to the Land Surveying/Geomatics Bachelor Applied Science program or technical geospatial employment.

I. General Education Requirements
GBC Orientation 0.5
English (ENG 101, 102 required) 6
Mathematics (MATH 126 and MATH 127 or MATH 128 recommended) 5
Science (PHYS 151 or PHYS 181 required, AST 101, ENV 100,
and GEOG 103 recommended) 13
Social Science (PSC 101*, PSY 101 or ANTH 101 recommended) 6
Humanities (HIST 105 recommended) 3
Fine Arts (ART 100 recommended) 3
Technology (GIS 109 required) 3
Total credits for Section I 39.5

II. Emphasis Courses
MATH 181 Calculus I 4
CADD 121 CAD for Land Surveyors 3
STAT 152 Introduction to Statistics 3
SUR 280 Fundamentals of Geomatics I 4
SUR 281 Fundamentals of Geomatics II 4
SUR 290 Introduction to Urban Development 4
Total credits for Section I and II 61.5
*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.

61.5 Credit Hours, with a 2.0 GPA

iv. Accreditation consideration (organization (if any) which accredits program, requirements for accreditation, plan for attaining accreditation - include costs and time frame)
None

v. Evidence of approval by appropriate committees of the institution
None

H. Readiness to begin program

i. Faculty strengths (specializations, teaching, research, and creative accomplishments

The courses that will be offered in the AS LSG degree are already being taught by Byron J. Calkins, the program advisor for the BAS LSG degree program.

Professional Preparation
Education:
2014, M.A.G. Applied Geography, New Mexico State University
2013, M.A. Online Learning and Teaching Certification, New Mexico State University
2009, B.S. Surveying Engineering: ABET Accredited, New Mexico State University
2004, A.S. Geographic Information Systems, Lyndon State College, Lyndonville, VT

Publications:
Calkins, Byron, et al; The Boundary Survey of the United States and Mexico "Hidalgo de Guadalupe Medir," Treaty of Guadalupe Hidalgo (1848). Surveying and Land Information Science, Volume 68, Number 4, December 2008, pp. 221-237(17 pages).
Calkins, Byron. Masters Thesis: Spatial analysis of future climate structure in New Mexico viticulture regions, New Mexico State University, December 2014.

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

Alignment:
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 20 years and know what is expected in a job environment and can bring examples of real life situations into my online classes.

Current Engineering and Research Projects:
Project 1: Vermont State Park Campground Site Design (In Progress). 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: Geophysical Site Assessment-Orleans, VT (Completed 2014). Employer: CSI
Retail giant Dollar General hired CSI through Cardno ATC, to perform a subsurface ground penetrating radar survey (GPR) on a potential commercial lot previously cleared of underground storage tanks (UST) to verify the claim of "cleaned. Gridded transects were laid out using a total station in all areas of interest (AOI). A site survey was performed collecting all pertinent parcel features above and below the proposed AOI(s). 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 excavation of the AOI(s) commenced to confirm possible hazardous targets. One UST and several 55 gallon drums were ultimately uncovered at the site based on the GPR surveys.

Project 3: Viewshed analysis for new Cellular Tower (Completed 2014). Employer: Consultant
The objective for this project was to identify the optimal site location for a proposed 45 meter cell tower in the Village of Quechee, VT. The methods employed for this project were to retrieve digital elevation data for the tower location and surround areas; create a contour layer for relief viewing and using raster math to query max elevation 30 meter pixel data within the client's 100 +/-ac property boundary. The client received a digital map depicting 10 meter relief contours with 20km and 35km buffer regions (around the proposed cell site) that were color-coded based on Line of Sight (LOS) modeling. Included with this map was a Google .kmz file that allowed my client to view and toggle between the different data layers.
Current Research: Spatial analysis of future climate structure in Nevada viticulture regions.
My 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.

Academic Endeavors:
2015- Program Advisor. Great Basin College, Elko NV
100% Online instruction, Course SUR 281
100% Online instruction, Course SUR 290
100% Online instruction, Course SUR 330
100% Online instruction, Course SUR 450
100% Online instruction, Course SUR 495
2014- Program Advisor. Great Basin College, Elko NV
100% Online instruction, Course SUR 280
100% Online instruction, Course SUR 320
100% Online instruction, Course SUR 340
100% Online instruction, Course SUR 440
100% Online instruction, Course SUR 460
2014-Adjunct Professor. New Mexico State University, Las Cruces NM.
100% Online Instruction, Course: SUR264 – Introduction to Land Information Systems.
2013-Adjunct Professor. New Mexico State University, Las Cruces NM.
Traditional Instruction, Course: SUR201 – GPS and Spatial Data Applications.
100% Online Instruction, Course: SUR264 – Introduction to Land Information Systems.
2012-Adjunct Professor. New Mexico State University, Las Cruces NM.
Traditional Instruction, Course: SUR264 – Introduction to Land Information Systems. 24

Synergistic Activities:

El Camino Real de Tierra Adentro Trail Association member (CARTA)
Bureau of Land Management partner/volunteer (BLM)
National Audubon Society member/volunteer
Great Basin College NALS Student Chapter Corporate Sponsor

Professional Development:
At the beginning of each semester, Great Basin College offers in-service training in professional development. These in-services are set up to help faculty work on best practices for all types of classes. Since technology is always changing, I spend a several hours every week researching new technology and how I can incorporate the information into my classes. Additionally, I meet once a month with the Elko based Nevada Association of Land Surveyors to discuss national, regional, and local surveying related topics. I attend State and National Conferences when available.

ii. Contribution of new program to department's existing programs (both graduate and undergraduate) and contribution to existing programs throughout the college or university
The Associate of Science Land Surveying/Geomatics provides the entering freshman a pathway into a BAS LSG degree and a career as a Land Surveyor/Geomatics technician or professional.

iii. Completed prior planning for the development of the program (recent hires, plans for future hires, securing of space, curricular changes, and reallocation of faculty lines)
The Associate of Science Land Surveying/Geomatics program course prerequisites already exist and the need for hiring, space, curricular changes and reallocation of faculty is not nessessary.

iv. Recommendations from prior program review and/or accreditation review teams
None

v. Organizational arrangements that must be made within the institution to accommodate the program
None

I. Resource Analysis

i. Proposed source of funds (enrollment-generated state funds, reallocation of existing funds, grants, other state funds)
None

ii. Each new program approved must be reviewed for adequate full-time equivalent (FTE) to support the program in the fifth year. Indicate if enrollments represent 1) students formally admitted to the program, 2) declared majors in the program, or 3) course enrollments in the program.

a. (1) Full-time equivalent (FTE) enrollment in the fall semester of the first, third, and fifth year.

1st fall semester 10

3rd fall semester 26

5th fall semester 32

(2) Explain the methodology/assumptions used in determining projected FTE figures.

The FTE figures are based on the number of responses received via the online BAS LSG webpage student interest form. The number of interested candidates averages around 100 per year. 35% of the current interested LSG BAS candidates have limited or no post-secondary education. If roughly 30% of the respondents apply to GBC, we can achieve these projected figures. Open enrollment encourages learners to begin the program on their schedule. Fall and spring new enrollment is projected to be identical. 50% of the program student body is projected to be comprised of traditional students who are enrolled and not employed full time and 80% will take advantage of completing the course work on time. The other 50% of the program will consist of non-traditional students who will lag behind the traditional student due to commitments outside of the classroom. 60% of this group will begin to graduate in year 3 and it will add 3 more student graduates per year. Carried forward at the 50% graduation rate, the enrollment reaches 32 overlapping students by year 5 with a graduation total of 25 students from spring year 2 to spring year 5.

b. (1) Unduplicated headcount in the fall semester of the first, third, and fifth year.

1st fall semester 10

3rd fall semester 10

5th fall semester 10

(2) Explain the methodology/assumptions used in determining projected headcount figures.

The unduplicated headcount figures are again based on the number of responses received via the online BAS LSG webpage student interest form. The number of interested candidates ranges from 10-12 per month. 35% percent of the responders interested LSG BAS candidates have limited or no post-secondary education. If 30% of the limited secondary education respondents enroll, we should average 10 new learners per year. Open enrollment encourages learners to begin the program on their schedule. Fall and spring new enrollment is projected to be identical.

iii. Budget Projections – Complete and attach the Five-Year Budget Projection Table.
N/A

J. Facilities and equipment required

i. Existing facilities: type of space required, number of assignable square feet, space utilization assumptions, special requirements, modifications, effect on present programs
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 CT Department currently uses three instructional computer labs on the Elko campus each with 25 computers, 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 CT Department has developed a

remote access 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, Surveying and CT. Additional software is acquired through special academic pricing from various specialty software companies such as Adobe, Camtasia, ERSI, Microsoft, and others. The cost of the annual license fees for these programs is covered entirely by lab fees.

The surveying lab equipment includes:

Equipment	
Trimble R6 GNSS Receiver	1
Trimble R6 Model 2 GNSS Receiver	1
Trimble R6 Model 3 GNSS Receiver	1
Trimble 4800 GNSS Receiver	4
Trimble Data Collector TSC1	3
Trimble Data Collector Ranger TSC3	2
TDS Data Logger Ranger	1
Trimble Data Logger TSCe	3
Trimble 1000 mAH battery	2
Trimble TDL 450 H Series Radios	1
Trimble HPB450 radio modem (Positioning Data Link)	2
Trimble Lithium-Ion Rechargeable Battery Pack 2.4 Ah 11.1 v	4
Trimble Charging unit Lot # 13193 Sept 05	1
Mean Well Chargers	2
12 Volt Interstate Batteries	2
SURVEY PRO TDS RECON	1
Fixed-Height Aluminum GPS Antenna Tripod with 2 m Center Staff	4
Aluminum SECO BI-PODS	3
Chicago Steel Tape 14' level rod (in tenths)	4
Ingenuity 5' Wooden Tripod	2
Trimble Fiberglass 2 Meter Rods	3
Trimble Fiber Carbon 2 Meter Rods	3
Pacific Crest Tripod	1
Sokkia Wooden Tripods	3
Topcon Wooden Tripods	1
Monsen Wooden Tripods	3
4.65 m Compression Lock Adjustable Tip Prism Pole - Red and White	4
CST/berger Magna-Trak 102 Magnetic Locator	1
100' Minvar Low Expansion base line tape	1
Topcon Auto Level AT G2 and G3	2
Carlo Zeiss Ni 2 Auto Level	1
Nikon Auto Level AZ-1 and AX0-1S	2
Nikon Theodolite NT-2	1
Lietz Theodolite TS20A	1
Trimble Total Station Geodimeter 600 CU (3601 DR and 3602 DR)	2
Topcon Total Station GTS-2 and GTS-3	3
Topcon Total Station GPT-3003	1
Sokkisha Total Station V2	2
Lufkin 100' Steel tape	6
100' Seco PVC-coated fiberglass tapes	6
Seco Optical Plummet Twist Focus Tribrach/w adapter	4
CTS/berger OPTIMA all metal prism	2

Omni Prism 4
AutoRanger-S EDM 1
Lietz DT5 EDM 1
Orange Construction Vests 10
Hammers6
HP DESIGN JET 755CM 1
CANON iPF650 image PROGRAF 1

ii. Additional facilities required: number of assignable square feet, description of space required, special requirements, time sequence assumed for securing required space
None

iii. Existing and additional equipment required
None

K. Student services required – Plans to provide student services, including advisement, to accommodate the program, including its implications for services to the rest of the student body

Student advisement sessions are scheduled during week 6 of the fall and spring semester. Advisement for the AS LSG online program will be delivered in a web conference environment where video, audio, screen and file sharing is permitted. The advisement session is blocked into one hour time intervals where current student advisement reports are generated and reviewed, current class performance and standings are discussed, and future course offerings and curriculum schedules are planned and produced. All student advisement information is collected and stored electronically in a spreadsheet, which allows the program advisor to predict future class sizes, future graduation dates and graduation class size, and other academic related trends.

L. Consultant Reports – If a consultant was hired to assist in the development of the program, please complete subsections A through C. A copy of the consultant's final report must be on record at the requesting institution.

i. Names, qualifications and affiliations of consultant(s) used
None

ii. Consultant's summary comments and recommendations
None

iii. Summary of proposer's response to consultants
None

M. Articulation Agreements

i. Articulation agreements were successfully completed with the following NSHE institutions. (Attach copies of agreements)
None

ii. Articulation agreements have not yet been established with the following NSHE institutions. (Indicate status)
None

iii. Articulation agreements are not applicable for the following institutions. (Indicate reasons)
None

N. Summary Statement

One of the core challenges the instructor and/or course designer faces within the online course environment is to create a blueprint where the learners are given the opportunity to access, explore, and achieve success within the confines of the online architecture. Learner success can be facilitated by creating parameters within the course infrastructure that leverages proven design strategies. Such design considerations in the proposed Associate of Science Land Surveying/Geomatics program are borrowed from the Quality Matters rubric. These standards, when incorporated into the course design; integrate and align the program, course, and unit objectives by scaffolding assessments and activities to assist in learner achievement. The ability to collaborate is essential for the online learner. Collaboration begins organically in threaded discussion boards or in forums such as VoiceThread and the Big Blue Button. Planned group activities also assist students in building a learning community where they are able to connect and share ideas with fellow peers. Such group activities like the NSPS NALS Silver State Student Surveying Chapter here at GBC provide the ideal venue to cultivate a learning community. These interactions take place using technology which allow the students to engage in collaborative learning in a distant environment. One of the valued Associate of Science Land Surveying/Geomatics proposed program objectives is to create an online program where interaction with the technology, course material, and learning community make for a rich, diverse, and satisfying educational experience. Finally, the Associate of Science Land Surveying/Geomatics proposed program and individual course offerings currently developed will need to stay current and up-to-date with industry trends and technology. The long-term success of the Associate of Science Land Surveying/Geomatics program and the Bachelor of Science Land Surveying/Geomatics program at Great Basin will be based on how well we prepare students to meet the demands and needs of the Surveying/Geomatics profession here in Nevada and nationally.

Land Surveying/Geomatics
Associate of Science (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 AS—Land Surveying/Geomatics	Credits
FALL—1st Semester Credits	
INT 100 GBC Orientation	0.5
AST 101 General Astronomy	3
ENV 100 Humans and the Environment	3
ENG 101 Composition I	3
MATH 128 Precalculus and Trigonometry	5
TOTAL 14.5	
SPRING—2nd Semester Credits	
ART 100 Visual Foundations	3
ENG 102 Composition II	3
GIS 109 Introduction to Geographic Information Systems	3
STAT 152 Introduction to Statistics	3
PSY 101 General Psychology	3
TOTAL 15	
FALL—3rd Semester Credits	
SUR 280 Fundamentals of Geomatics I	4
PHYS 151 General Physics I or PHYS 180	4
CADD 121 CAD for Land Surveyors	3
HIST 105 European Civilization I to 1648	3
PSC 101 Introduction to American Politics*	3
TOTAL 17	
SPRING—4th Semester Credits	
GEOG 103 Physical Geography	3
MATH 181 Calculus I	4
SUR 281 Fundamentals of Geomatics II	4
SUR 290 Introduction to Urban Development	4
TOTAL 15	
Minimum Credits	**61.5**

I. General Education Requirements

GBC Orientation 0.5

English (ENG 101, 102 required) 6

Mathematics (MATH 126 and MATH 127 or MATH 128 (Math 128 recommended) 5-6

Science (PHYS 151 or PHYS 180 required, AST 101, ENV 100, and GEOG 103 recommended) 13

Social Science (PSC 101*, PSY 101 or ANTH 101 recommended) 6

Humanities (HIST 105 recommended) 3

Fine Arts (ART 100 recommended) 3

Technology (GIS 109 required) 3

II. Emphasis Courses

MATH 181 Calculus I 4

CADD 121 CAD for Land Surveyors 3

STAT 152 Introduction to Statistics 3

SUR 280 Fundamentals of Geomatics I 4

SUR 281 Fundamentals of Geomatics II 4

SUR 290 Introduction to Urban Development 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.

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, and edit spatial information in professional applications.
- Develop a sound background in the humanities, social sciences, and the arts, to function in multicultural and diverse environments.
- 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 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's 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 or PHYS 180 Physics for Scientists and Engineers 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

COM 101 Oral Communication, or THTR 102 Introduction to Stage Voice, or THTR 221 Oral Interpretation 3

ECON 311 Professional Ethics 3

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

MATH 182 Calculus II 4

Total credits for Section I **19**

SUGGESTED COURSE SEQUENCE*
BAS—Land Surveying/Geomatics

FALL—1st Semester Credits
COM 101, THTR 102, or THTR 221 (3)
INT 339 or INT 349 (3)
MATH 182 (4)
SUR 320 (3)
SUR 360 (3)
TOTAL 16

SPRING—2nd Semester Credits
INT 359 or INT 369 (3)
ENG 333 (3)
PHYS 152 or PHYS 181 (4)
SUR 330 (3)
SUR 365 (3)
TOTAL 16

FALL—3rd Semester Credits
ECON 311 (3)
MGT 310 (3)
SUR 340 (3)
SUR 440 (3)
SUR 460 (3)
TOTAL 15

SPRING—4th Semester Credits
FIN 310 (3)
MGT 323 or MGT 367 (3)
MGT 441 (3)
SUR 450 or SUR 455 (3)
SUR 495 (3)
TOTAL 15

Total 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

Total credits for Section II 27

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

MGT 441 Operational Quality Control and Problem Solving 3

PHYS 152 General Physics II or PHYS 181 Physics for Scientists and Engineers II 4

Total credits for Section III 16

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's 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.