PROGRAM APPROVAL FORM

COVER SHEET

Trades and Professional Services
SCHOOL

Construction Trades
DEPARTMENT

Associate of Science in Surveying Technology
PROGRAM TITLE

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AUTHOR

March 19, 2009
DATE SUBMITTED

Check the action to be taken and have the indicated people sign.

☒ Program Adoption - all signatories
☐ Program Substantive Revision - all signatories except President

APPROVED BY	NAME	APPROVED	DISAPPROVED	DATE	ACTION*
DEPARTMENT CHAIR	Robert Balajadia	☒	☐	3/19/09	
REGISTRAR	Patrick L. Clymer	☒	☐	3/24/09	NC
DEAN	Reilly Ridgell	☒	☐	3/24/09	
CURRICULUM COMMITTEE CHAIR	Anthony San Nicolas	☒	☐	3/30/09	
VP, ACADEMIC AFFAIRS	R. Ray D. Somera, Ph.D.	☒	☐	3/30/09	WC
PRESIDENT	Mary A. Y. Okada	☒	☐	4.01.09	

* Indicate if the document had no corrections (NC), was approved with minor corrections (WC), or was disapproved and returned back to author (BTA).

This version of the cover sheet facilitates the eventual transition to an all on-line curricula approval process.

Paper Copy Archived 4.10.09 * pending ACCJC Approval
Banner SCACRS pdf _____
C: Binder AY Catalog _____
Electronic MS Word _____

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PROGRAM APPROVAL FORM
FOR ADOPTION AND SUBSTANTIVE REVISION

I. TYPE OF ACTION

Check the type of action that applies. If previous Program Approval Form exists, please attach.

A. ☒ Adoption program

B. ☐ Substantive Revision (attach Program Form).
The numbers listed next to the changes below may or may not require a response; they have been identified as those questions most likely needing to be addressed. The entire program form should be reviewed for applicability.

- ☐ Change in number of credit hours: II, IVA, IVD, VI, VII, VIII, XI
- ☐ Change in Technical/Core Requirements: II, IVA, IVD, VI, VII, VIII, XI
- ☐ Change in distribution of requirements affecting Related Technical or General Education Requirements, Technical/Core Requirements, or General Education Requirements: II, IVA, IVD, VI, VII, VIII, XI.
- ☐ Identify specific changes not listed above:

II. INTRODUCTION

The Associate of Science in Surveying Technology program lays out the foundation for life-long learning in the technical and ever changing geospatial disciplines of surveying, mapping, and Geographic Information Systems (GIS). The Surveying Technology program is designed to provide the knowledge and skills required for employment at the senior survey party chief or GIS technician level.

The Associate of Science in Surveying Technology is an area emphasized in The Architecture & Construction Career Cluster; one out of 16 career clusters selected in Guam's Career & Technical Education Five-Year State Plan, 2008-2013. Design/Pre-Construction in which surveyors are listed, is one of the three specialties identified by the National Career Technical Education Foundation (www.careerclusters.org). The other two areas under the Architecture & Construction Career Cluster are Construction and Maintenance/Operations.

III. PROGRAM DESCRIPTION & STUDENT LEARNING OUTCOMES - PROGRAM LEVEL

This program description will appear in the College Catalog followed by the Student Learning Outcomes – Program Level

Program Description:

The Surveying Technology program prepares the student for immediate employment as a surveying or Geographic Information Systems (GIS) technician and teaches the student knowledge and skills that will enable one to adapt to ever evolving technical and technological changes in geospatial field and office applications.The graduate will be prepared to face the challenge of modern Surveying and GIS practice. The program emphasizes applications-

based approaches and provides an overview of the geospatial fields of surveying, mapping, and GIS and prepares the student for further study and for the Level 3 Certified Survey Technician examination prepared by the American Society on Surveying and Mapping National Society of Professional Surveyors (ACSM-NSPS).

A. General Education Requirements
EN110 Freshman English (3)
MA161A College Algebra/Tech Math I (4)
CS151 Windows Applications (3)
SI141 Applied Physics I (4)
PY120 General Psychology (3)
SO130 Introduction to Sociology (3)
Total Gen Ed: 20

B. Technical Requirements

SU100	**Surveying Drafting (3)**
SU101	**Surveying Problems I (3)**
CE211	**Plane Surveying I (3)**
CE222	**Plane Surveying II (3)**
SU230	**Advanced Surveying (3)**
SU240	**Boundary Law I (3)**
SU241	**Boundary Law II (3)**
SU250	**Introduction to Geographic Information Systems (3)**
SU251	**Advanced Geographic Information Systems (3)**
SU280	**Special Topics in GIS (3)**
SU292	**Surveying Practicum (1)**

Minimum Total Technical Requirements: 31

C. Related General Education & Technical Requirements

AE121	**Technical Engineering Drawing I (3)**
AE150	**Computer Aided Design & Drafting (CADD) I (3)**
CS101	**Introduction to Computer Systems & Information Technology (3)**
HL130	**First Aid & Safety (1)**
MA161B	**College Algebra & Trigonometry (4)**
OA101	**Keyboarding Applications (3)**

Total Related General Education & Technical Requirements: 17

Total Credits Required 68

If the description above is a revision, indicate the catalog page(s) to be revised.
Catalog Year:
Page Number(s):

Upon successful completion of this program, students will be able to:

1. **Demonstrate preparedness to enter productive technical positions in the geospatial fields of surveying, mapping, and Geographic Information Systems.**

2. **Successfully pass the American Society on Surveying and Mapping National Society of Professional Surveyors (ACSM-NSPS) Level 3 Certified Survey Technician examination.**
3. **Develop a professional work ethic needed in the surveying industry.**
4. **Demonstrate ability to utilize modern measurement technologies to acquire spatial data and employ industry-standard software to solve technical problems.**

IV. RATIONALE FOR PROPOSAL

A. Reason this proposal should be adopted in light of the College's mission statement and educational goals.
The Guam Community College is mandated to provide technical and vocational education to meet the needs of Guam's workforce and is committed to providing a comprehensive offering of vocational-technical programs. This program develops the knowledge and expertise of those interested in working in the geospatial fields of surveying, mapping, and Geographic Information Systems.

B. Long-term employment outlook for this program area, including the number of available positions in the service area for graduates and expected salary level.
Very good in light of the military build-up with expected entry salary levels above $25,000 per annum.

C. Conformity of this program to legal and other external requirements. Include State Voc/Tech requirements, accrediting agency standards, State Board regulations, and professional certification or licensing requirements if applicable.
The program complies with the curriculum outline for the ACSM-NSPS Certified Survey Technician program. Student should be able to successfully pass the ACSM-NSPS Level 3 Certified Survey Technician examination.

D. Results of program evaluation (see Appendix F for Checklist).
The transfer of the military from Japan to Guam will require the services of surveying, mapping, and GIS technicians during the design, construction, and maintenance of the military buildup. The Guam Society of Professional Land Surveyors recognizes the need to train the local workforce in surveying and mapping and is fully supportive of this program. In addition, the path towards licensure as a Professional Land Surveyor requires successful completion of many of the courses, or their equivalent, outlined here. Completion of this program will partially fulfill the academic portion of professional licensure.

In addition to the author being a licensed surveyor, Mr. David Eaton, the President of Guam Society of Professional Land Surveyors (GSPLS) reviewed and concurred with this course. There is a Construction Trades Advisory Committee; however, this was established for construction only and not the pre-construction/design area in which surveying falls. The DC of Construction Trades will establish a separate advisory committee for the surveying programs in Fall 2009 with focus on the Design/Pre-Construction Pathway. See attached letters of support from GSPLS, Guam Department of Land Management, Guam Waterworks Authority, and The Pacific Association of Land Professionals.

V. RESOURCE REQUIREMENTS AND COSTS

A. Resources (materials, media, and equipment) and costs.

Books, computers, scientific calculators, projectors, survey instruments and accessories are needed; total cost approximately $30,000. The program may also utilize sofware donated by Environmental Systems Research Institute (ESRI) and Carlson Software during the Pacific Association of Land Professionals conference sponsored by GCC in 2007 (valued over $100,000).

B. Personnel requirements (administrative, instructional, and support staff) and costs.
The surveying and GIS courses can be taught by adjunct faculty who have knowledge and expertise in surveying and GIS. Regular salary scales (full-time/adjunct) will apply. Office support staff normally provided to faculty will be sufficient.

C. Facility requirements.
Existing classroom space and use of the campus field for survey fieldwork will be sufficient.

D. Funding source(s).
The program will be part of the locally funded College budget and students will pay the usual tuition and fees, except for the online courses which are charged by the sponsoring institution. As the core surveying and GIS courses are part of the proposed Apprenticeship program, some of the costs can be funded through the Apprentice program.

E. Impact, financial or otherwise, this program may have on the College.
Financial impact will depend on cost for faculty and resources as indicated in Item A above.

VI. IMPLEMENTATION SCHEDULE

Implementation date: **Fall 2009**

VII. CATALOG (MOVED TO SECTION III.)

VIII. PROGRAM DESCRIPTION

A. Program Title(s)
Long Title: **Associate of Science in Surveying Technology**
Abbreviated Title (20 characters maximum): **Surveying Technology**

B. Credit Hours

General Education:	**20**
Technical/Core:	**31**
Related Tech/Gen Ed:	**16**
Electives:	
Options:	
Total Number of Credits:	**68**

C. Course Sequence
First Semester
AE121 Technical Engineering Drawing I (3)
CE211 Plane Surveying I (3)
CS101 Introduction to Computer Systems & Information Technology (3)
EN110 Freshman English (3)
MA161A College Algebra/Technical Mathematics (4)
Total Credits: 16

Second Semester
AE150 Computer Aided Design & Drafting (CADD) I (3)
CE222 Plane Surveying II (3)
MA161B College Algebra & Trigonometry (4)
OA101 Keyboarding Applications (3)
SU100 Surveying Drafting (3)
SU101 Surveying Problems I (3)
Total Credits: 19

Third Semester
CS151 Windows Applications (3)
SI141 Applied Physics I (4)
SU230 Advanced Surveying (3)
SU240 Boundary Law I (3)
SU250 Introduction to Geographic Information Systems (3)
Total Credits: 16

Fourth Semester
HL130 First Aid & Safety (1)
PY120 General Psychology (3)
SO130 Introduction to Sociology (3)
SU241 Boundary Law II (3)
SU251 Advanced Geographic Information Systems (3)
SU280 Special Topics in GIS (3)
SU292 Surveying Practicum (1)
Total Credits: 17

AS in Surveying Technology Total Credits: 68

D. Target Population
High school graduates, individuals interested in the Associate Program in Surveying Technology, or adults seeking re-training in new fields/career.

E. Cost to Student
Regular tuition and lab fees apply.

IX. PRE-REQUISITE (S)

EN100R, EN100W or placement test before taking EN110
MA110A Finite Mathematics (3) or test out on placement test before taking MA161A

X. CO-REQUISITE (S)

XI. CONTENT

A. List of courses, with course descriptions, required to complete this program. Courses grouped according to: General Education, Technical Requirements, etc. If new courses are part of the program, Course Guides must be included with this request for approval.

A. General Education Requirements

EN110	**Freshman English**	**3**
MA161A	**College Algebra/Technical Mathematics**	**4**
CS151	**Windows Applications**	**3**
SI141	**Applied Physics I**	**4**
PY120	**General Psychology**	**3**
SO130	**Introduction to Sociology**	**3**
Minimum Total General Education Requirements		**20**

B. Technical Requirements

SU100 Surveying Drafting 3

This course deals with typical job responsibilities of an office draftsperson or survey party chief in completing a graphic description of survey fieldwork. These descriptions/ plans result from a great variety of engineering fieldwork requiring diverse methods of graphic resolution. Emphasis will be placed on using computer aided software.

SU101 Surveying Problems I 3

This is a mathematics course designed to give the student an understanding of the fundamentals of basic survey computations. Emphasis is placed on basic arithmetic, trigonometric, and geometric operations pertaining to traverse, triangulation, and general survey calculations.

CE211 Plane Surveying I 3

A beginning course in surveying techniques designed to give the student an understanding of the fundamentals of chaining, leveling, and proper use of the total station. Horizontal and vertical measurements; errors, traversing, leveling and stadia; recording of field notes.Care and adjustment of instruments and office procedures are also considered. Provision is made for appropriate fieldwork for practical application of the techniques learned.

CE222 Plane Surveying II

This course is a continuation of Plane Surveying I and it deals with general construction surveys and construction surveys dealing with slopes and curves. Reconnaissance procedures are discussed and the students are acquainted with the prospects of employment as surveyors. Students will be divided into survey teams and given area assignments to survey and make contour maps. Prerequisite: CE211

SU230 Advanced Surveying 3

This course will cover advanced topics in surveying including highway and construction surveying, property and legal issues in boundary surveying, concepts of elementary geodetic surveying, and an overview of Global Positioning Systems (GPS) as applied to surveying for centimeter accuracy measurement. Prerequisite: CE222

SU240 Boundary Law I 3

This course introduces the concepts of boundary control and legal principles. Topics covered include proportionate measurement, rights in land, junior/senior title rights, retracement of original surveys, deed first/ survey first, common and case law, ranking/ prioritizing evidence, controlling monuments and corners, errors in legal descriptions, and plats and case studies.

SU241 Boundary Law II 3
This course is a continuation of Boundary Law I and covers the subjects of evidence and procedures for determining real property boundaries. Statutes and case law, conflicting evidence, proper methods and procedures for collecting evidence, riparian rights, surface and subsurface rights and eminent domain are studied in detail. Boundary agreements and legal instruments prepared by the land surveyor are introduced. The role of the land surveyor as an expert witness is presented. Prerequisite: SU240 and permission of Advisor

SU250 Introduction to Geographic Information Systems 3
This course will provide students with basic knowledge of Geographic Information Systems (GIS) (e.g., sources of GIS data, various data models). Special emphasis will be given to the manipulation of digital spatial vector data with application to cadastral surveys. One of the objectives of the course is to provide students with hands on experience with GIS software and hardware components.

SU251 Advanced Geographic Information Systems 3
This course is a more advanced study of Geographic Information Systems (GIS) with particular emphasis on manipulation and analysis of raster data. This course will also provide introduction to ArcGIS Spatial Analyst and 3D Analyst. Prerequisite: SU250

SU280 Special Topics in GIS 3
This course will introduce students to the applications of Geographic Information Systems (GIS) in cadastral and land information systems and in land use planning. Geographic data is increasingly important in understanding society and the environment. Using advanced tools and software, students will have an opportunity to focus on local and global planning problems. Prerequisite: SU250

SU292 Surveying Practicum 1
This course covers the application of field and office techniques related to the lessons covered in the surveying and drafting courses. Students will do actual field and office survey work to learn proper use of surveying and related instruments including computers and data collectors. Prerequisite: CE222

Minimum Total Technical Requirements

C. Related General Education & Technical Requirements: 34

AE121 Technical Engineering Drawing I 3

A study of the use of drawing instruments and techniques for mechanical, civil and architectural drawings involving freehand sketches, lettering, orthographic views and pictorial drawings. Skill development will focus on the use of drawing instruments to redraw given drawings calling for accurate measurements with detailed instructions on how to do it.

AE150 Computer Aided Design & Drafting (CADD) I 3
An introduction to computer aided design and drafting software as a drafting/design tool. This course is designed to introduce students to the use of computers in producing line drawings. Topics include equipment components, terminology, drawing with the computer, storing and retrieving drawings, and printing and plotting. This hands-on course uses the design computer-aided drafting and design software application. Prerequisites: AE121, CS101

CS101 Intro to Computer Systems & Information Technology 3
This course provides students with an overview of computer technology, computer hardware and software, data communications, the Internet, social and ethical impacts on society, and an exploration of career opportunities.

HL130	**First Aid & Safety**	**1**
MA161B	**College Algebra & Trigonometry**	**4**
OA101	**Keyboarding Applications**	**3**
Minimum Total Related General Education & Technical Requirements:		**17**
Minimum Total Technical Requirements		**68**

XII. PROGRAM MEANS OF ASSESSMENT AND CRITERIA FOR SUCCESS

Upon completion, the student should be able to pass the ACSM-NSPS Certified Survey Technician Level 3 examination.

XIII. ARTICULATION

A. Secondary programs

B. University of Guam

C. Others

* Attach SLO Map – Program & Course Levels.

SLO Map – Program & Course Levels

Courses with an asterisk are for the associate program only.

Name of Program Surveying Technology **Certificate AND Associate** **If courses are not offered as a program, skip to page 2.* **I = Introduced R = Reinforced E = Emphasized** **List course alpha and no.** ⇩	AE150	SU100	SU101	CE211	CE222	SU220	SU250	SU292	SU240*	SU241*	SU251*	SU280*	
Student Learning Outcomes – Program Level Upon successful completion of this program, students will be able to:													
1. CERTIFICATE: Demonstrate preparedness to enter productive technical positions in the geospatial fields of surveying, mapping, and Geographic Information Systems.	I	I	R										
2. CERTIFICATE: Successfully pass the American Society on Surveying and Mapping National Society of Professional Surveyors (ACSM-NSPS) Level 1 Certified Survey Technician examination.				E	R	I							
3. CERTIFICATE: Develop a professional work ethic needed in the surveying industry.							R	E	I				
1. ASSOCIATE: Demonstrate preparedness for entry into mid-level technical postitions in the geospatial fields of surveying, mapping, and Geographic Information Systems (GIS).								E	R	I			
2. ASSOCIATE: Successfully pass the American Society on Surveying and Mapping National Society of									E	R	I		

Professional Surveyors (ACSM-NSPS) Level 3 Certified Survey Technician examination and pursue licensure as a Professional Land Surveyor through experience working under a Professional Land Surveyor.													
3. ASSOCIATE: Develop a professional work ethic needed in the surveying industry.								IRE					
4. ASSOCIATE: Demonstrate ability to utilize modern measurement technologies to acquire spatial data and employ industry-standard software to solve technical problems.								IRE					

General Education Student Learning Outcomes by Course - 1 of 3

Name of Program Surveying Technology **Certificate AND Associate** **I = Introduced R = Reinforced E = Emphasized** **List course alpha and no.** ⇩	AE150	SU100	SU101	CE211	CD222	SU220	SU250	SU292	SU240*	SU241*	SU251*	SU280*	
GenEd Student Learning Outcomes Upon completion of this course, students will be able to:													
1. Written Communication: Use writing to discover, organize and communicate ideas.	I					IR	IR	E	RE				
2. Written Communication: Identify and analyze the audience and purpose for any intended communication.	I					IR	IR	E	RE				
3. Written Communication: Demonstrate mastery of the conventions of writing, including grammar, spelling, and mechanics.						IR	IR	E	RE				
4. Quantitative Reasoning: Apply numeric, symbolic, and graphic skills and other forms of quantitative reasoning accurately and appropriately.	I	IR	R	R	R	RE	RE	E	R	R	R		
5. Quantitative Reasoning: Demonstrate mastery of mathematical concepts, skills, and applications, using technology when appropriate.	I	IR											
6. Quantitative Reasoning: Define quantitative issues and problems, gather relevant information, analyze that information, and present results.	I	IR											
7. Oral Communications: Properly identify the audience and purpose of any intended communication.					I	I	IR	E					
8. Oral Communications: Use appropriate language, techniques, and strategies.					I	I	IR	E					
9. Oral Communications: Speak clearly and confidently, using voice, volume, tone, and articulation.					I	R	R	E					
10. Oral Communications: Use effective communication strategies to initiate and sustain discussion.							IR	E				E	

General Education Student Learning Outcomes by Course - 2 of 3

Name of Program Surveying Technology Certificate AND Associate I = Introduced R = Reinforced E = Emphasized List course alpha and no. ⇩	AE150	SU100	SU101	CE211	CE222	SU220	SU250	SU292	SU240*	SU241*	SU251*	SU280*	
Student Learning Outcomes - GenEd Upon completion of this course, students will be able to:													
11. Oral Communications: Summarize, analyze, and evaluate oral communications and ask coherent questions as needed.							I	I					
12. Critical Thinking Skills: Properly identify and state issues, problems, or questions contained in a body of information.	I	I	I	I	R	R	RE	RE				R	
13. Critical Thinking Skills: Identify and analyze assumptions and underlying points of view relating to an issue or problem	I	I	I	I	R	R	R	E	R	R	R	E	
14. Critical Thinking Skills: Evaluate a problem, distinguishing between relevant and irrelevant facts, opinions, assumptions, issues and biases.	I	I	I	I	R	R	R	E				IRE	
15. Critical Thinking Skills: Apply problem-solving techniques and skills, including the rules of logic and logical sequence.					I	I	RE	E				I	
16. Critical Thinking Skills: Synthesize information from various sources, drawing reasoned conclusions.							IR	E				IR	
17. Critical Thinking Skills: Reflect upon and evaluate their thought processes, value systems, and worldviews in comparison to those of others.								I					
18. Info. Literacy: Locate, evaluate, and use information effectively.	I	I			R	R	R	R					
19. Info. Literacy: Properly use and cite a variety of sources.													
20. Info. Literacy: Use digital text, images, and data, as needed, transferring them from their original locations and formats to a new context, using a variety of software applications.	IR							RE				RE	

General Education Student Learning Outcomes by Course - 3 of 3

Name of Program Surveying Technology **Certificate AND Associate** **I = Introduced R = Reinforced E = Emphasized** **List course alpha and no.** ⇩	AE150	SU100	SU101	CE211	CE222	SU220	SU250	SU292	SU240*	SU241*	SU251*	SU280*	
Student Learning Outcomes - GenEd Upon completion of this course, students will be able to:													
21. Info. Literacy: Use and access information ethically and legally, with an understanding of what constitutes plagiarism.													
22. Individual and Society: Demonstrate an awareness of the relationship between the environment and their own physiological and psychological processes.												IRE	
23. Individual and Society: Examine critically and appreciate the values and beliefs of their own culture and those of other cultures.								IRE					
24. Individual and Society: Acknowledge opposing viewpoints.								IRE				E	
25. Individual and Society: Demonstrate an understanding of ethical, civic, and social issues relevant to Guam, Micronesia, and the world.								IR				IR	
26. Civic Engagement: Participate fully in a civic engagement experience where a service is provided to the community that relates to the academic curriculum.													
27. Civic Engagement: Evidence an understanding of the relevance of the completed civic engagement work to the subject matter of the course where the civic engagement experience was assigned.													
28. Civic Engagement: Demonstrate an awareness of the need for and value of lifelong civic engagement in addressing local community needs.													

Student Learning Outcomes – Course Level

**If courses are not offered as a program, skip 'Related to Program Level SLO' column.*

Course Alpha and Number: AE150 **Upon successful completion of this course, students will be able to:**	**Related to Program Level SLO#**
Produce line drawings using computer technology.	1,2
Demonstrate and explain basic equipment components and terminology used in the Computer Aided Design & Drafting (CADD) career.	1,2
Demonstrate basic proficiency using design software.	1

Course Alpha and Number: SU100 **Upon successful completion of this course, students will be able to:**	**Related to Program Level SLO#**
Discuss the roles of office draftpersons or survey party chiefs.	1,2
Define common terminology in the surveying drafting career.	2
Explain the diverse engineering feildwork and methods of graphic resolution used.	1,2

Course Alpha and Number: SU101 **Upon successful completion of this course, students will be able to:**	**Related to Program Level SLO#**
Demonstrate understanding of basic mathematics needed for survey computations.	1,2
Apply basic arithmetic, trigonometry and geometric operations to given surveying problems.	1,2
Discuss and identify solutions to various surveying problems encountered in the work setting.	1,2,3

Course Alpha and Number: CE211 **Upon successful completion of this course, students will be able to:**	**Related to Program Level SLO#**
Describe the fundamentals of chaining, leveling, and use of transit as it relates to plane surveying.	1,2
Properly care, adjust, and use equipment in the plane surveying field.	1,2
Given a set of tasks, demonstrate proper use and application of surveying equipment and tools.	1,2

Course Alpha and Number: SU220 Upon successful completion of this course, students will be able to:	Related to Program Level SLO#
Demonstrate proficiency in the mathematical computations of horizontal and vertical surveys including the process of laying out horizontal and vertical curves.	1,2
Apply proper survey processes in construction surveys and layouts.	1,2
Demonstrate understanding of boundary surveying and the legal aspects of property surveying.	1,2
Analyze boundary and property survey problems using applicable survey methods.	1,2
Demonstrate understanding of concepts of geodetic and GPS surveying.	1,2,4

Course Alpha and Number: SU292 Upon successful completion of this course, students will be able to:	Related to Program Level SLO#
Demonstrate the knowledge and skills needed in the surveying field.	1,2,3
Demonstrate preparedness to successfully pass thethe Level 1 Certified Survey Technician	1,2,3

Course Alpha and Number: SU250 Upon successful completion of this course, students will be able to:	Related to Program Level SLO#
Describe the fundamental concepts of GIS and the major functionality contained within the ArcGIS software.	1,2,3
Explain the GIS analytical process and be proficient with a variety of ArcGIS tools to solve realistic problems. (The course emphasizes practical GIS skills.)	1,2,4
Demonstrate understanding of the basics of the geodatabase and the more advanced functionality that makes the geodatabase such a powerful data model.	1,2
Design presentation-quality maps and create a personal geodatabase.	1,2,4

Course Alpha and Number: SU240* Upon successful completion of this course, students will be able to:	Related to Program Level SLO#
Demonstrate understanding of boundary control and legal principles to include identification of errors in legal descriptions.	1,2
Discuss legal principles such as deed first/survey first, common and case law.	3

examination prepared by the American Society on Surveying and Mapping National Society of Professional Surveyors (ACSM-NSPS) for certificate majors or the Level 3 for associate majors.	

Course Alpha and Number: SU241* **Upon successful completion of this course, students will be able to:**	**Related to Program Level SLO#**
Explain in detail the subjects of evidence and procedures used for determining real property boundaries.	1,2
Demonstrate proficiency of reading legal instruments prepared by land surveyors.	1,2
Describe the surveyor's role in court cases.	1,2,3
Write a legal and technical description and prepare a surveyor's report.	1,2

Course Alpha and Number: SU280* **Upon successful completion of this course,**	**Related to Program**

Define the basic elements of a boundary survey and the proper sequence of events/actions.	3
Evaluate boundary evidence and make decisions based on this ranking.	1,2,4
Identify controlling corners and boundaries.	1,2,4

Course Alpha and Number: SU251* **Upon successful completion of this course, students will be able to:**	**Related to Program Level SLO#**
Produce and control raster data using ArcGIS Spatial Analyst.	1,2,4
Create a variety of raster surfaces including hillshde relief maps, slope and aspect surfaces, and density and distance surfaces.	1,2
Create, execute, and automate spatial analysis work flows.	1,2,4
Explain what a surface model is and create both raster and vector surfaces.	1,2

Course Alpha and Number: CE222 **Upon successful completion of this course,**	**Related to Program**

students will be able to:	Level SLO#
Produce and manipulate cadastral data and create parcel data using the Survey Analyst Extension and the Cadastral Editor tools in the ArcGIS software.	1,2
Apply Survey Analyst GIS tools on cadastral datasets and perform analysis of these datasets to ensure survey accuracy.	1,2
Use ArcGIS tools to address real-world social, economic, and environmental planning problems.	1,2,3,4

students will be able to:	Level SLO#
Demonstrate a variety of surveying techniques.	1,2
Aplly appropriate skills using proper surveying instruments given various tasks.	1,2,4
Discuss reconnaissance, preliminary, and construction surveys.	1,2,4

If this SLO Map is not part of a Program Adoption or Program Substantive Revision, attach a Non-Substantive Curriculum Revision Memo to the front of this form to ensure that the SLOs, as written above, will be published in GCC's online catalog under program/course descriptions.