

# **Instructional Program Review 2019/20 UPDATE**

**Geographic Information Systems**

**Created on: 09/06/2019 11:20:00 AM PST  
Last Modified: 02/05/2020 02:35:40 PM PST**

# Table of Contents

<b>General Information</b>	<b>1</b>
<b>2019/20 Instructional Program Review</b>	<b>2</b>
Submission Information and Updates (REQUIRED).....	2
Outcomes and Assessment (REQUIRED).....	3
Program Analysis for Equity and Excellence (REQUIRED).....	3
Program Goals (REQUIRED).....	3
Action Plans for Goals (REQUIRED).....	6
Goal Status Report (REQUIRED).....	10
<b>Request Forms</b>	<b>16</b>
Classified Position, BARC and Faculty Position Request.....	16
<b>Reviewers</b>	<b>17</b>
Liaison's Review.....	17
Manager's Review.....	17
<b>Appendix</b>	<b>18</b>

## **General Information (Instructional Program Review 2019/20 UPDATE)**

---

## 2019/20 Instructional Program Review

### SUBMISSION INFORMATION AND UPDATES (REQUIRED)

- Name of Lead Writer: Rachel Russell
- Name of Liaison: Xiaochuan Song
- Department Chair: Carlos Toth
- Name of Manager/Service Area Supervisor: Danene Brown
- Is this a CTE program? (State Yes or No): YES

### Part B:

The Geographic Information Systems program is a Career Technical Education program designed to prepare students for entry-level positions and to update the skills of working professions. Our students receive hands-on and project-based training on industry standard software and best practices. We are very proud of our Work Experience, relationship with our regional industry and Advisory Committee, and our dedicated faculty.

### Strengths:

- Industry connections

GISG students must complete a Work Experience before they can earn their certificate or A.S. This experience gives students hands-on training in the industry to better prepare them for the job market. Supervisor evaluations regularly recognize Mesa's interns as competent and well prepared on the GIS software. The internship connections in the community continues to grow to reflect the diverse interests/backgrounds of students and the expanding of GIS into many disciplines and industries. In the 2018/19 Academic Year, 20 students enrolled and passed the WE requirement. The connection to regional employers has helped GIS build a new Advisory Committee. Many of our committee members started as internship supervisors. Our Committee works with faculty to identify emerging industry needs and advise on course sequencing, necessary skills, and new graduate expectations. They also offer much needed feedback on software and hardware acquisitions.

- Faculty preparation

GIS faculty are dedicated to preparing our students to succeed as GIS Technicians. All adjuncts are currently working GIS professionals, and several have GIS Professional Certifications. Faculty regularly attend GIS conferences and workshops to keep their skills updated. Additionally, class material is regularly updated to reflect new developments in software, technologies, and methodology. Faculty are members of national, regional and local professional associations. In Spring 2019, two faculty members (full time and adjunct) received STEM Lab Redesign mini-grants to update course material to the newest software version.

- Success rates

GIS continues to have relatively high success rates, with an average success rate of 74% from 2018-19. In the same academic year, 11 Certificates of Achievement and 5 A.S. degrees were awarded.

- Student highlights
  - ◊ A.S Student Rhiannon Killian won 2019 GeoTech Center's Geospatial Technology Student Competition.
  - ◊ 8 Students presented their research posters at the ESRI User Conference's Map Gallery (July 2019). Certificate student S. Chad Spoon's map, *Investigating Healthy and Unhealthy Food Access within the City of San Diego: Site Suitability for Locating a New Healthy Food Store*, is under consideration for inclusion in the ESRI 2020 Map Book.
  - ◊ Multiple students received job offers and are now fully employed at ManTech, Helix Environmental, County of San Diego, Dudek, D-Max Engineering, Inc.,
  - ◊ Multiple students have transferred to SDSU.
  - ◊ One student has started a graduate program in Biology at Eastern Michigan University.

### Challenges:

- Equity issues remain

The Program Analysis section of Program Review dives into the details of equity, but some areas of concern:

1. Our greatest equity gap is with African American students at -45%. Of 45 valid enrollments, there were only 9 success counted. When breaking this gap down by classes, the majority of our African American students are taking GISG 104 and GISG 110, our

two intro classes. GISG 104 is intended to be a GE for transfer, while GISG 110 is the first of the certificate program. Perhaps more troubling is that there are not enough reported African American students in GISG 111, 112, 113, 114, 130, and 131 to have data for these classes. There is also not enough data for African American students in 2015/15, 2015/16, 2016/17 and 2018/19. This lack of students contributes to the noticeable gap in why our African American students are not succeeding and therefore why they are not continuing on in the program.

2. Our Latinx students have an overall equity gap of -1%. This equity gap exists or is slightly larger in most classes, but notably, in GISG 112, 113, 130 this trend reverses and Latinx students have higher success rates than all other race/ethnic groups.
3. Diversity in across the board decreases as students complete upper division courses. In general, our student population tends to be older, white, and enter with more bachelor degrees that the average Mesa Student. This could be in part because we tend to attract students looking to update skills to be more competitive on the job market and GISG 104 targets a broader Mesa student population looking to transfer or compete their GE. However, these potential reasons are only part of the story, and we need to investigate how to attract and better support our students to continue on the GIS path.

Another equity challenge for GISG is the availability of course software and technologies to students. Students have free access to the ESRI ArcGIS course software that they can install on their home PC. However, if students do not have a home PC they cannot access the software at home. The software is also difficult to install and requires a fast processor. Newer versions of the software required high graphic cards and hard drive requirements. Additionally, the ENVI remote sensing software is not available for students at home at an affordable rate. This requires students to have to come to campus to use the LRC or the STEM Center. The opening of the STEM Center has been great by allowing students to access the software on Saturdays. Equity for all technology students or students working on expensive software would be greatly improved by a VPN or other network solution that would allow students to access LRC computers from home. While this won't alleviate issues for our students who do not have access to a PC, it will allow students who work full time or have other responsibilities to complete course work outside of the classroom and LRC hours.

- Resources for faculty training in emerging technologies and new instructional strategies

With constantly updating technology, it is essential for faculty to remain up-to-date on industry applications and emerging technologies. There are limited resources and support available for faculty training in emerging technologies, such as drone mapping and aerial surveying. Additionally, as interest in online classes grow, there needs to be more resources and training for faculty on online instructional strategies as well as funding for software and hardware for online teaching. Currently, these are all funded through the competitive Perkins process. .

## OUTCOMES AND ASSESSMENT (REQUIRED)

**Form:** 2019/20 Program Review Outcomes and Assessment Section (See appendix)

## PROGRAM ANALYSIS FOR EQUITY AND EXCELLENCE (REQUIRED)

**Form:** 2019/20 Program Review Instructional Program Analysis Section (See appendix)

## PROGRAM GOALS (REQUIRED)

### 2019/2020 Goals

#### Create new courses and certificates

There are unmet GIS work force needs in the region. The faculty will work with the advisory group and professional organizations to identify the courses and certificates. Faculty will work to update existing course offerings to better meet these demands.

### Mapping

**CA- Mesa College Strategic Directions and Goals:** Strategic Goal 1.1, Strategic Goal 3.2, Strategic Goal 3.3,  
**CTE 2018/19:** Perkins Core Indicator Activity 2, Perkins Core Indicator Activity 3, Perkins Permissive Use 10.10, Perkins Permissive Use 10.12, Perkins Permissive Use 10.9, Perkins Requirement 4, Perkins Requirement 7, Strong Workforce Recommendation 3, Strong Workforce Recommendation 7, Strong Workforce Recommendation 8,  
**Institutional Learning Outcomes 2016/17:** Information Literacy

### Maintain and upgrade hardware and software

Upgrade hardware as industry develops latest editions . The hardware and software need to be installed and maintained in a timely fashion.

### Mapping

**CA- Mesa College Strategic Directions and Goals:** Strategic Goal 1.4, Strategic Goal 3.2, Strategic Goal 4.2,  
**CTE 2018/19:** Perkins Core Indicator Activity 1, Perkins Core Indicator Activity 2, Perkins Core Indicator Activity 3, Perkins Core Indicator Activity 4, Perkins Core Indicator Activity 5, Perkins Core Indicator Activity 6, Perkins Permissive Use 10.7, Perkins Requirement 4, Perkins Requirement 1, Perkins Requirement 7, Strong Workforce Recommendation 2, Strong Workforce Recommendation 7,  
**Institutional Learning Outcomes 2016/17:** Information Literacy

### Student Success and Completion

Overall, our student success rates need to be improved. This is a long term goal where we will be working with our industry partners, CTE grants, and other professional development opportunities to improve student success. With the newly approved Certificate of Achievement, we can better track our graduates and have an accurate count of degrees earned.

### Mapping

**CA- Mesa College Strategic Directions and Goals:** Strategic Goal 1.1, Strategic Goal 1.2, Strategic Goal 3.1, Strategic Goal 3.2, Strategic Goal 3.3, Strategic Goal 4.1, Strategic Goal 4.2,  
**Institutional Learning Outcomes 2016/17:** Critical Thinking, Information Literacy

### Grow enrollments

GISG will work with regional academic and industry partners to recruit more students.

### Mapping

**CA- Mesa College Strategic Directions and Goals:** Strategic Goal 1.1, Strategic Goal 1.2, Strategic Goal 1.3, Strategic Goal 3.1, Strategic Goal 3.2, Strategic Goal 3.3, Strategic Goal 4.1, Strategic Goal 4.2,  
**Institutional Learning Outcomes 2016/17:** Critical Thinking, Information Literacy

## 2019-2020 Goals

### Create new courses and certificates

There are unmet GIS work force needs in the region. The faculty will work with the advisory group and professional organizations to identify the courses and certificates. Faculty will work to update existing course offerings to better

meet these demands.

### Mapping

**CA- Mesa College Strategic Directions and Goals:** Strategic Goal 1.1, Strategic Goal 3.2, Strategic Goal 4.1,  
**CTE 2018/19:** Perkins Core Indicator Activity 1, Perkins Core Indicator Activity 2, Perkins Core Indicator Activity 3, Perkins Core Indicator Activity 5, Perkins Core Indicator Activity 6, Perkins Permissive Use 10.3, Perkins Permissive Use 10.7, Perkins Permissive Use 10.9, Perkins Requirement 4, Perkins Requirement 1, Perkins Requirement 3, Perkins Requirement 7, Strong Workforce Recommendation 1, Strong Workforce Recommendation 3, Strong Workforce Recommendation 7,  
**Institutional Learning Outcomes 2016/17:** Critical Thinking, Information Literacy

### Maintain and upgrade hardware and software

All hardware and software need to meet industry standards; the hardware and software need to have a stable funding source. The hardware and software need to be installed and maintained in a timely fashion.

### Mapping

**CA- Mesa College Strategic Directions and Goals:** Strategic Goal 1.1, Strategic Goal 1.3, Strategic Goal 1.5, Strategic Goal 1.6, Strategic Goal 3.2, Strategic Goal 3.3, Strategic Goal 4.2, Strategic Goal 6.1,  
**CTE 2018/19:** Perkins Core Indicator Activity 1, Perkins Core Indicator Activity 2, Perkins Core Indicator Activity 3, Perkins Permissive Use 10.7, Perkins Requirement 4, Perkins Requirement 7, Strong Workforce Recommendation 2,  
**Institutional Learning Outcomes 2016/17:** Communication, Critical Thinking, Information Literacy, Professional & Ethical Behavior

### Create classroom textbook bank

This textbook bank will provide students who cannot purchase the textbooks access to these textbooks.

### Mapping

**CA- Mesa College Strategic Directions and Goals:** Strategic Goal 1.2, Strategic Goal 1.3, Strategic Goal 1.4, Strategic Goal 4.1,  
**CTE 2018/19:** Perkins Core Indicator Activity 1, Perkins Core Indicator Activity 2, Perkins Core Indicator Activity 3, Perkins Core Indicator Activity 6, Perkins Permissive Use 10.7, Perkins Requirement 4, Perkins Requirement 1, Strong Workforce Recommendation 2,  
**Institutional Learning Outcomes 2016/17:** Information Literacy

### Student Success and Completion

Overall, our student success rates need to be improved. This is a long term goal where we will be working with our industry partners, CTE grants, and other professional development opportunities to improve student success. With the newly approved Certificate of Achievement, we can better track our graduates and have an accurate count of degrees earned.

## Mapping

**CA- Mesa College Strategic Directions and Goals:** Strategic Goal 1.1, Strategic Goal 1.3, Strategic Goal 1.4, Strategic Goal 3.2, Strategic Goal 3.3, Strategic Goal 4.1,

**CTE 2018/19:** Perkins Permissive Use 10.3, Strong Workforce Recommendation 2

## Grow enrollments

GISG will work with regional academic and industry partners to recruit more students.

## Mapping

**CA- Mesa College Strategic Directions and Goals:** Strategic Goal 1.2, Strategic Goal 1.3, Strategic Goal 1.4, Strategic Goal 1.5, Strategic Goal 1.6, Strategic Goal 3.2,

**CTE 2018/19:** Perkins Core Indicator Activity 1, Perkins Core Indicator Activity 2, Perkins Core Indicator Activity 3, Perkins Core Indicator Activity 5, Perkins Core Indicator Activity 6, Perkins Permissive Use 10.2, Perkins Permissive Use 10.7, Perkins Requirement 1, Perkins Requirement 7, Strong Workforce Recommendation 11, Strong Workforce Recommendation 2, Strong Workforce Recommendation 3, Strong Workforce Recommendation 8,

**Institutional Learning Outcomes 2016/17:** Information Literacy

## ACTION PLANS FOR GOALS (REQUIRED)

### Actions

#### 2019-2020 Goals

##### Goal

#### **Goal: Create new courses and certificates**

There are unmet GIS work force needs in the region. The faculty will work with the advisory group and professional organizations to identify the courses and certificates. Faculty will work to update existing course offerings to better meet these demands.

#### **Action:** Create and update courses

<b>Describe the actions needed to achieve this objective:</b>	Meet with advisory groups, professional organizations to identify needed skills; design material to incorporate skills into classwork.
<b>Who will be responsible for overseeing the completion of this objective:</b>	Rachel Russell
<b>Provide a timeline for the actions:</b>	Ongoing
<b>Describe the assessment plan you will use to know if the objective was achieved and effective:</b>	Survey work experience supervisors for student's skill level and needed skills.



<b>List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel &amp; Conference, Software, Facilities, Classified Staff, Faculty, Other):</b>	Updated hardware and software that meets industry standards, conference and travel
---	--

**Goal: Maintain and upgrade hardware and software**

All hardware and software need to met industry standards; the hardware and software need to have a stable funding source. The hardware and software need to be installed and maintained in a timely fashion.

**Action: Secure funding for hardware and software**

<b>Describe the actions needed to achieve this objective:</b>	Secure consistent, stable funding source for GIS software (ESRI and ENVI) at Mesa. Work with industry advisory committee to identify needed hardware or other tools students need to be proficient on.
<b>Who will be responsible for overseeing the completion of this objective:</b>	Rachel Russell
<b>Provide a timeline for the actions:</b>	Ongoing
<b>Describe the assessment plan you will use to know if the objective was achieved and effective:</b>	Did we obtain stable funding source for GIS software? y/n Identify needed hardware and work to find funding to purchase.
<b>List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel &amp; Conference, Software, Facilities, Classified Staff, Faculty, Other):</b>	GIS software- ESRI, ENVI TBD future hardware

**Goal: Student Success and Completion**

Overall, our student success rates need to be improved. This is a long term goal where we will be working with our industry partners, CTE grants, and other professional development opportunities to improve student success. With the newly approved Certificate of Achievement, we can better track our graduates and and have an accurate count of degrees earned.

**Action: Address equity gaps**

<b>Describe the actions needed to achieve this objective:</b>	Identify equity gaps Find professional development activities to close the gap Incorporate OER material
<b>Who will be responsible for overseeing the completion of this objective:</b>	Rachel Russell, Adjuncts
<b>Provide a timeline for the actions:</b>	1-2 years.
<b>Describe the assessment plan you will use to know if the objective was achieved and effective:</b>	Compare success rates before and after incorporating equity-minded practices into classes, in particular online classes.
<b>List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel &amp; Conference, Software, Facilities, Classified Staff, Faculty, Other):</b>	Stable, consistent software funding Remote desktop for students! Conference/travel for professional development/course material development.

**Action:** Incorporate more project-based assignments and scaffolding in class

<b>Describe the actions needed to achieve this objective:</b>	Develop or identify more OER resources for students as demo and scaffolding assignments to better prepare them for final projects
<b>Who will be responsible for overseeing the completion of this objective:</b>	Rachel Russell and adjunct faculty
<b>Provide a timeline for the actions:</b>	1 year
<b>Describe the assessment plan you will use to know if the objective was achieved and effective:</b>	Compare course outcomes and success rates before/after concerted effort to address success rates.
<b>List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel &amp; Conference, Software, Facilities, Classified Staff, Faculty, Other):</b>	Consistent GIS software funding Tutors

**Action:** Increase retention of students across certificate path

<b>Describe the actions needed to achieve this</b>	Identify students who are not continuing to certificate Determine why they are leaving classes
--	---

<b>objective:</b>	Apply any possible lessons to coursework to improve retention and success (remove barriers for success!).
<b>Who will be responsible for overseeing the completion of this objective:</b>	Rachel Russell, adjuncts
<b>Provide a timeline for the actions:</b>	1-2 years
<b>Describe the assessment plan you will use to know if the objective was achieved and effective:</b>	Create survey instrument to ask students why they withdrew/dropped the course, identify if any changes can be made. Compare certificate completion rates before/after changes.
<b>List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel &amp; Conference, Software, Facilities, Classified Staff, Faculty, Other):</b>	

**Goal: Grow enrollments**

GISG will work with regional academic and industry partners to recruit more students.

**Action: Identify new sources of students**

<b>Describe the actions needed to achieve this objective:</b>	Work with regional academic and industry partners to recruit more students Work with Strong Workforce and WBL to advertise GIS program Work with local high schools
<b>Who will be responsible for overseeing the completion of this objective:</b>	Rachel Russell
<b>Provide a timeline for the actions:</b>	Ongoing
<b>Describe the assessment plan you will use to know if the objective was achieved and effective:</b>	Compare enrollment and completion rates over a 3 year period. Now that TOP codes have been fixed, we should be able to correctly identify our students that complete the program and better see enrollment rates.
<b>List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel &amp; Conference, Software, Facilities, Classified Staff, Faculty, Other):</b>	

## GOAL STATUS REPORT (REQUIRED)

### Action Statuses

#### 2019-2020 Goals

Goal

##### **Goal: Create new courses and certificates**

There are unmet GIS work force needs in the region. The faculty will work with the advisory group and professional organizations to identify the courses and certificates. Faculty will work to update existing course offerings to better meet these demands.

##### **Action:** Create and update courses

**Describe the actions needed to achieve this objective:**

Meet with advisory groups, professional organizations to identify needed skills; design material to incorporate skills into classwork.

**Who will be responsible for overseeing the completion of this objective:**

Rachel Russell

**Provide a timeline for the actions:**

Ongoing

**Describe the assessment plan you will use to know if the objective was achieved and effective:**

Survey work experience supervisors for student's skill level and needed skills.

**List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel & Conference, Software, Facilities, Classified Staff, Faculty, Other):**

Updated hardware and software that meets industry standards, conference and travel

##### Status for Create and update courses

**Current Status:**

In Progress

**If the Current Status was marked Completed, what was the impact of the completed objective on your program:**

**If the Current Status was not marked Completed, what are the implications and next steps:**

This is an ongoing goal. In a technology field, courses, material, and software must be upgraded every semester to meet the changing demands of the industry.

**Goal: Maintain and upgrade hardware and software**

All hardware and software need to met industry standards; the hardware and software need to have a stable funding source. The hardware and software need to be installed and maintained in a timely fashion.

**Action: Secure funding for hardware and software**

**Describe the actions needed to achieve this objective:**

Secure consistent, stable funding source for GIS software (ESRI and ENVI) at Mesa. Work with industry advisory committee to identify needed hardware or other tools students need to be proficient on.

**Who will be responsible for overseeing the completion of this objective:**

Rachel Russell

**Provide a timeline for the actions:**

Ongoing

**Describe the assessment plan you will use to know if the objective was achieved and effective:**

Did we obtain stable funding source for GIS software? y/n  
 Identify needed hardware and work to find funding to purchase.

**List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel & Conference, Software, Facilities, Classified Staff, Faculty, Other):**

GIS software- ESRI, ENVI  
 TBD future hardware

**Status for Secure funding for hardware and software**

**Current Status:**

In Progress

**If the Current Status was marked Completed, what was the impact of the completed objective on your program:**

**If the Current Status was not marked Completed, what are the implications and next steps:**

Consistent funding for software has been secured, our needs for hardware will change over the years. This may be broken into separate goals next review cycle.

**Goal: Student Success and Completion**

Overall, our student success rates need to be improved.

This is a long term goal where we will be working with our industry partners, CTE grants, and other professional development opportunities to improve student success.

With the newly approved Certificate of Achievement, we can better track our graduates and and have an accurate count of degrees earned.

**Action: Address equity gaps**

<b>Describe the actions needed to achieve this objective:</b>	Identify equity gaps Find professional development activities to close the gap Incorporate OER material
<b>Who will be responsible for overseeing the completion of this objective:</b>	Rachel Russell, Adjuncts
<b>Provide a timeline for the actions:</b>	1-2 years.
<b>Describe the assessment plan you will use to know if the objective was achieved and effective:</b>	Compare success rates before and after incorporating equity-minded practices into classes, in particular online classes.
<b>List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel &amp; Conference, Software, Facilities, Classified Staff, Faculty, Other):</b>	Stable, consistent software funding Remote desktop for students! Conference/travel for professional development/course material development.

**Status for Address equity gaps**

<b>Current Status:</b>	In Progress
<b>If the Current Status was marked Completed, what was the impact of the completed objective on your program:</b>	
<b>If the Current Status was not marked Completed, what are the implications and next steps:</b>	This is an ongoing challenge as each semester highlights new equity gaps and presents new opportunities for professional development.

**Action: Incorporate more project-based assignments and scaffolding in class**

<b>Describe the actions needed to achieve this objective:</b>	Develop or identify more OER resources for students as demo and scaffolding assignments to better prepare them for final projects
<b>Who will be responsible for overseeing the completion of this objective:</b>	Rachel Russell and adjunct faculty
<b>Provide a timeline for the actions:</b>	1 year
<b>Describe the assessment plan you will use to know if the objective was achieved and effective:</b>	Compare course outcomes and success rates before/after concerted effort to address success rates.
<b>List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel &amp; Conference, Software, Facilities, Classified Staff, Faculty, Other):</b>	Consistent GIS software funding Tutors

Status for Incorporate more project-based assignments and scaffolding in class

<b>Current Status:</b>	In Progress
<b>If the Current Status was marked Completed, what was the impact of the completed objective on your program:</b>	
<b>If the Current Status was not marked Completed, what are the implications and next steps:</b>	Faculty have received funding from STEM lab redesign grants to update and improve lab materials for some courses. Next steps would be to incorporate these methods into all courses and update yearly as needed.

**Action:** Increase retention of students across certificate path

<b>Describe the actions needed to achieve this objective:</b>	Identify students who are not continuing to certificate Determine why they are leaving classes Apply any possible lessons to coursework to improve retention and success (remove barriers for success!).
<b>Who will be responsible for overseeing the completion of this objective:</b>	Rachel Russell, adjuncts
<b>Provide a timeline for the actions:</b>	1-2 years
<b>Describe the assessment plan you will use to know if</b>	Create survey instrument to ask students why they withdrew/dropped the course, identify if any changes can be made. Compare certificate completion rates

**the objective was achieved and effective:** before/after changes.

**List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel & Conference, Software, Facilities, Classified Staff, Faculty, Other):**

Status for Increase retention of students across certificate path

**Current Status:** Not started

**If the Current Status was marked Completed, what was the impact of the completed objective on your program:**

**If the Current Status was not marked Completed, what are the implications and next steps:**

This action will be started in spring 2020

**Goal: Grow enrollments**

GISG will work with regional academic and industry partners to recruit more students.

**Action:** Identify new sources of students

**Describe the actions needed to achieve this objective:** Work with regional academic and industry partners to recruit more students  
Work with Strong Workforce and WBL to advertise GIS program  
Work with local high schools

**Who will be responsible for overseeing the completion of this objective:** Rachel Russell

**Provide a timeline for the actions:** Ongoing

**Describe the assessment plan you will use to know if the objective was achieved and effective:** Compare enrollment and completion rates over a 3 year period. Now that TOP codes have been fixed, we should be able to correctly identify our students that complete the program and better see enrollment rates.

**List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer**



**Equipment, Travel & Conference, Software, Facilities, Classified Staff, Faculty, Other):**

Status for Identify new sources of students

**Current Status:** In Progress

**If the Current Status was marked Completed, what was the impact of the completed objective on your program:**

**If the Current Status was not marked Completed, what are the implications and next steps:**

This is an ongoing goal. Now that our courses have correct TOP codes, we should be able to better track enrollments and degrees.

## Request Forms

---

**CLASSIFIED POSITION, BARC AND FACULTY POSITION REQUEST**

## Reviewers

---

### LIAISON'S REVIEW

**Form:** Instructional Program Liaison's Review 2019/20 UPDATE

### MANAGER'S REVIEW

**Form:** Instructional Program Manager's Review 2019/20 UPDATE

# Appendix

- 
- A. **2019/20 Program Review Outcomes and Assessment Section** (Form)
  - B. **2019/20 Program Review Instructional Program Analysis Section** (Form)
-

# Form: "2019/20 Program Review Outcomes and Assessment Section"

**Created with :** Taskstream

**Participating Area:** Geographic Information Systems

## **(REQUIRED) Program name**

Geographic Information Systems

## **(REQUIRED) Are you on target with your assessment schedule?**

GIS is mostly on target with their assessments. There is one course, GISG 130 that has not recently been assessed because it has been cancelled in previous semesters, or not assessed by the adjunct. It will be assessed for all CLOs this fall, 2019.

## **(REQUIRED) What have your assessments revealed about your courses/programs/service area/school/division/office?**

Within the Digital Technology department, we regularly discuss outcomes at semester department meetings. Most faculty agree that project-based assessments are the best way to gauge our student's progress towards our LOs. However, there is a common theme that to have more successful outcomes, we should incorporate more guided exercises or scaffolding before students get started on their independent work. Many faculty have been relying less on traditional textbooks because of how quickly they go out of date. There are more of us creating our own text materials or looking for OER materials to support our assignments and projects. Overall as a department, Digital Technology meets our benchmark of 70% students passing/earning passing grade on their assessed assessment. Finally, all programs continually update our assignments to meet industry needs and better prepare students.

For GIS specifically, most courses are meeting our benchmark of 70% of students passing the assessment tool. Project-based assessments continue to be the best way to prepare our students for the workforce and help them develop a portfolio. This past year, critical thinking CLOs were assessed. While students continue to develop research questions for projects and use their skills to think critically about how to answer those questions, there are some concerns that students need to develop more problem-solving and resiliency. Faculty are also interested in using class time to demo tools versus going over lectures, and will look into a slight "flipping" of the classroom to make lecture material available early. There is also interest in changing GISG 113 to a 16-week class, and this will be piloted in the fall. Faculty expressed interest in adding prerequisites back for GISG 131 as students who do not have any GIS experience tend to struggle in the course. Several faculty discussed updating rubrics to better reflect assignment.

## **(REQUIRED) Based on your assessments, what resource needs have you identified?**

Currently, GIS faculty are looking for additional funding to travel and attend conferences and other professional development opportunities.

## **Please provide any other comments.**

*No answer specified*

# Form: "2019/20 Program Review Instructional Program Analysis Section"

Created with : Taskstream

Participating Area: Geographic Information Systems

## Program Name

---

**(REQUIRED) Type your program name.**

Geographic Information Systems

**Part A: In this section, please analyze your program in terms of course success metric. Start by disaggregating the available data by race, gender, and any other parameters of interest to your program and answer the following questions.**

---

**(REQUIRED) A1. What patterns do you notice with regard to equity in course success at the program level by race/ethnicity?**

You may also conduct analysis by course and/or by modality.

Equity Gap: When a group of students who share a common characteristic (e.g. race/ethnicity) have lower access and/or outcome rates than their peers. The size of the equity gap along with the size of the group determine whether that gap is significant. Larger groups should, statistically, have smaller gaps and therefore when gaps are present (even small ones) they may be significant. Smaller groups will see wider variation in outcomes, therefore gaps should be seen consistently over time and/or reviewed by looking at multiple years in aggregate to determine if they are significant.

Overall, GIS course success rates for all classes remain close to college average, at 74% in 2018/19. When breaking this down into race/ethnicity, course modality, and by course some patterns emerge.

### 1. Race/ethnicity

1. Our greatest equity gap is with African American students at -45%. Of 45 valid enrollments, there were only 9 success counted. When breaking this gap down by classes, the majority of our African American students are taking GISG 104 and GISG 110, our two intro classes. GISG 104 is intended to be a GE for transfer, while GISG 110 is the first of the certificate program. Perhaps more troubling is that there are not enough reported African American students in GISG 111, 112, 113, 114, 130, and 131 to have data for these classes. There is also not enough data for African American students in 2015/15, 2015/16, 2016/17 and 2018/19. This lack of students contributes to the noticeable gap in why our African American students are not succeeding and therefore why they are not continuing on in the program.
2. Our Latinx students have an overall equity gap of -1%. This equity gap exists or is slightly larger in most classes, but notably, in GISG 112, 113, 130 this trend reverses and Latinx students have higher success rates than all other race/ethnic groups.

- Diversity in across the board decreases as students complete upper division courses. In general, our student population tends to be older, white, and enter with more bachelor degrees that the average Mesa Student. This could be in part because we tend to attract students looking to update skills to be more competitive on the job market and GISG 104 targets a broader Mesa student population looking to transfer or compete their GE. However, these potential reasons are only part of the story, and we need to investigate how to attract and better support our students to continue on the GIS path.

	Age 30-39	Have Bach. Degree	Percent White
Mesa Student	14 %	10%	32%
GISG	39 %	55%	55%

**(REQUIRED) A2. Do these patterns persist over time (e.g., look at the last five years)? Describe if equity gaps are increasing, decreasing, or staying the same?**

GISG success rates tend to have cyclical rises and falls over the past 5 years, but generally hover around 70%. There are noticeable dips in success rates in 2017/18 for Asian, Filipino, Latinx and Other students. This causes overall success rates to drop to 69%. White students had a slight incline, there is no data for American Indian or Pacific Islander. African American students only have one data point for the 5 year period (2017/18), and it is significantly lower at 29% success. All success rates appear to bounce back in 2018/19 with an average of 74% success for all students, except those that marked "other".

Success rates and equity gap tends to improve for all groups in the Spring than in the Fall or Summer. The only group that has a slight decline in the equity gap is Latinx, going from a -3% gap to a -4% gap. Our number of Latinx-identified students increases overall in the Spring terms as well.

Equity gap patterns varies across ethnic groups. Of the groups with consistent data throughout the 5 years, Latinx students remain with negative a negative equity gap. This gap has closed from a high of -8% in 2014/15 to a -4% in 2018/19. In 2017/18 our Latinx equity gap was at a high of +1. The equity gap for Asian remain consistently positive, except for the 17/18 school year which reflects the broader trends in success during this academic year. Similarly White students have positive equity gaps in all years, except for 16/17 when there was a swing to -8%. For the category Other, this group of students went from a low of -11% in 2014/15 to 7% in 2017/18. This gap expanded back to -9% in 2018/19.

**(REQUIRED) A3. What factors may have influenced these results? What are your most significant findings?**

Most significant findings:

- General lack of diversity of our students, particularly in upper division classes. We only have consistent data for Asian, Latinx, Other, and White students for program success rates, meaning other groups had fewer than 10 students and are not

displayed in the results. As this diversity decreases in upper division courses, we have even fewer data points.

2. GISG 104, our introductory course that satisfies a GE, appears to be one of our courses with the most diverse student population and the lowest overall success rates (61%). This course is also only offered online.

What factors may influence our results.

1. As mentioned above, our program mostly targets students looking to update their skills or change careers or become more competitive on the job market. Many of our GIS Certificate or AS seeking students already enter with a degree and do not take GISG 104. There is traditionally only a small number of students that take 104 then begin taking the certificate courses.
2. Our fully online courses tend to have lower success rates, averaging at 60%. Courses that are taught fully online included GISG 104 and GISG 110. While these courses tend to be popular, students may not be aware of the time commitment required to learn a new software independently. New teaching methods need to be included in these courses to help boost success rates.

**(REQUIRED) A4. How have you/might you alter practices to increase student success and reduce equity gaps?**

There needs to be increased attention on success rates for our lower division courses (GISG 104, GISG 110) to boost continuation rates in through the certificate program. The noticeable lack of diversity in upper division courses is concerning, as is the larger equity gaps for some ethnic groups. Faculty will continue to consult with the LOFT team and other on-campus professional development resources related to equity in online classes and online teaching. For example, faculty are working to identify OER resources to help reduce the cost of textbooks and this barrier to success. Each semester, faculty ensure the software students need to successfully complete their assignments are available in the LRC computers. One major hurdle is with students who do not have a computer at home or cannot install the software at home. A remote desktop connection to campus or district computers would be a huge help to GIS and all Mesa students.

Second, faculty will continue to bring in diverse guest speakers to class. Faculty will look into "Skype a scientist"-style video chats where students can participate remotely or watch a recorded Zoom session at a later date as a way to bring these guest lectures into the online class. Faculty will also work to diversify the advisory committee as well.

There are also a large number of withdrawals in 104 and 110 (14-35% in some years). It would be good to figure out why students are withdrawing or dropping the course to see if it is something the faculty could work on and translate to increased success rates and decreased equity gaps.

**(REQUIRED) A5. How does your program contribute to the College's identity of being a Hispanic Serving Institution?**



In Spring 2019, two faculty members received HSI-STEM mini-grants to update their GIS labs to be in the latest version of the software. These projects were designed to fill the gaps of existing lab materials and the software changes. Students working on the most current, up-to-date version of the software will be better prepared to meet our local industry's skill needs.

The full-time faculty member has worked with the STEM Center and Innovation Research Lab to ensure the computers have all GIS software programs on them for GIS students or other disciplines who need to use the software. Several GIS textbooks are kept in the STEM Center library.

**(REQUIRED) A6. Have you identified resource needs? If yes, please list.**

1. Funding for faculty conference travel and professional development

**(REQUIRED) A7. Do any of your program goals address these implications or needs? If not, please develop a new goal that addresses your findings and subsequent reflection.**

**2018/19 Action Plans**

- Classroom library - achieved
- Open computer lab - ongoing
- Sustainable software funding -achieved
- Updated hardware/software - achieved and ongoing.

**2019/2020 Goals**

After reviewing the data for this year, recommendations for goals/actions include:

- Update hardware and software to meet industry standards
- Actions:
  - Meet with advisory groups, professional organizations to identify needed skills;
  - design material to incorporate skills into classwork.
  - Work with industry advisory committee to identify needed hardware or other tools students need to be proficient on.
- Address student success issues and equity gaps
  - Attend FLEX activities on serving online students and diverse student population, implement findings into classroom
  - Focus on GISG 110 and 104 in particular due to lower student success rates
  - Incorporate more scaffolding and project-based learning in class to better prepare students, teach critical thinking, resilience
  - Identify barriers for students to stay on certificate path
- Grow enrollments
  - Work with regional academic and industry partners to recruit more students
  - Identify student populations to target
  - Work with WBL to establish more internships, or WBL opportunities.

**Part B: In this section, look at the area of focus you identified in last year's program review and answer the following questions.**

---

**(REQUIRED) B1. How have you developed this focus? Are you seeing any results? What are your next steps?**

**2018/19 Areas of Focus and Updates**

- Increasing success rates for all students and underrepresented students

In 2018/19, GISG began to receive accurate graduation data. First, GISG TOP codes have been updated allowing for the correct classification of students in the major/certificate. Second, this was the first year the Certificate of Achievement was active. In 2018 we had 5 students graduate with an A.S. (equal to 2017/18 rate) and 11 earn a Certificate of Achievement.

Between 2017/18 and 2018/19 success rates were increased for females, Asian, students 18-24, 49-50 and 50+, resulting in positive equity gaps for these populations. Success rates also increased for our Basic skills/Ed. Development, Career/Vocational, Concurrent University students, and undecided students.

There are disappointing success rates include targeting our African American, Latinx ,and other demographic groups that are underrepresented. Several ethnic groups are no longer included in the 2018/19 data, signaling a drop below the 10 student minimum. These student populations need particular focus to boost these numbers. Additionally, we are seeing decrease in success rates for first generation students, from 59% to 52%, and our Associate Degree students, from 79% to 67%.

For the next year, GISG will focus primarily on GISG 110 for our Latinx students as it is the class with our largest equity gap. GISG 104 will be another class targeted for change as it has the lowest success rate of our courses over the past 2 academic years. These courses also have large online components. Faculty will continue to seek out FLEX activities and other trainings to improve success rates for the target Latinx population and in online course in general.

- Increasing enrollments

Student enrollments increased from 331 in 17/18 to 349 in 18/19. The bulk of this growth came in our summer enrollment, from 34 in Summer 17 to 62 in Summer 18. There continue to be opportunities for growth in our enrollments, and faculty along with the industry advisory committee will need to identify additional areas.

- Updating curriculum, technology, and course materials to reflect changing industry needs and demands

The most significant update to GISG's technology is the campus funding for critical software, including ESRI GIS software and ENVI remote sensing software. This will permit GIS software to be deployed across the campus for the STEM center, IRL, and any other department to use. Having campus-wide access will allow GIS faculty to recruit students beyond our traditional students and hopefully grow enrollments. Having a sustainable funding source for software will only benefit student success and retention.

In the past year, GISG 112, GISG 113, GISG 114, and GISG 130 have updated lab material to the current edition of the ArcGIS Pro software. As the local GIS industry shifts from ArcGIS Desktop to ArcGIS Pro, our students will be prepared to help transition their future workplace to the latest and greatest software. GISG 113 and GISG 114 updates were supported by a STEM lab redesign mini grant. Instructors are regularly updating their course material to be more relevant to our students and our local industry. More of our courses are shifting to project-based learning and scaffolding.

To support student skills development on GPS data collection and management, Android tablets, iPads, and GNSS receivers were obtained through Perkins, BARC, and Strong Workforce funding. The Android tablets were used in a GISG 130 ground truth lab and will be used in the Spring to support data management in GISG 114. Success and retention rates will be assessed in future semesters. These tablets were also used to support GIS activities at the Majors fair and at the Empower middle school event.

- Working to improve equitable access of software and hardware resources for all students

Books were obtained using BARC funding for classroom textbook library. Additional copies were put on reserve in the LRC. The textbook library has been used in GISG 112 and GISG 130. This has alleviated textbook costs for several students. The classroom library and copies on reserve have been a big help to students in GISG 104 who purchase the e-book edition. The e-book does not have page numbers or step numbers for labs. The hard copy of the text increases lab completion and retention in the course. Having a hard copy for the lab has been helpful for several online students who then take advantage of the software/computers in the LRC. These textbooks were first available in Fall 2019, student outcomes will be assessed in future semesters.

GIS is working with CISC to develop a proposal for an open computer lab and ILT. This is an important resource for our students that will help decrease software purchases and increase student access. Usage of the STEM Center by GISG students remains consistent, and GISG will continue to support the STEM Center.