Foothill College GIS Program Advisory Board Meeting Minutes

April 13, 2021—Zoom meeting

Attending

Alexis Aguilar, Foothill College Instructor;
Adam Araza, city of Cupertino;
Amadea Azerki, ESRI;
Theresa Do, Foothill College student;
Garrett Dunwoody, Google;
Jan Evans, Foothill College student;
John Falkowski, Santa Clara County Parks & Recreation;
Nathan Greig, Mid-Pen Open Space;
Angela Lee, ESRI;
Felicia Herron, Foothill College student;
Kurt Hueg, Foothill College Interim Associate VP of Instruction;
Richard Kos, SJSU;
Totran Mai, San Jose Water;
Stace Maples, Stanford;
Allison Lenkeit Meezan, Foothill College Instructor;
Sam Mercado, Foothill College student;
Cristina Milesi, Foothill College Instructor;
Remy Moncayo, Foothill College student;
Tobias Nava, Foothill College Counselor EOPS;
Teresa Ong, Foothill College Workforce CTE programs;
Margaret Pettygrove, city of Milpitas;
Steve Rodriguez, city of Mountainview;
Cindy Schmidt, NASA Ames;
Amber Wittner, Foothill College Instructor;

Program Overview

Meeting begins with a slide presentation by Allison providing program information in the context of the region's geospatial tech ed picture, see slides. Since providing a fully online certification option in 2018-19, the program is attended by students all over CA, with a handful from out-of-state or international. Program highlights include a low-cost of tuition for a high-wage discipline. Pay for a high school graduate with GIST certification begins at $24-25/hr. Many students get jobs before completing the certificate. Many students also attend to add onto their current degree for a pay bump.

Program challenges include:

- Uneven enrollment. Helped by transferring to online program, still struggling
- Increase in enrollment possibly due to COVID, not "out of the woods" yet
- College budget constraints. Need a minimum of 20 to run, with ideally 31-40 students per class
- VMWare is highly dependent on student's internet connection and can be difficult (shared home internet or relying on hot spots)

Curriculum

Foothill college instructors presented an overview of individual classes to ask for input to changes in curriculum.

- GIST 11: cartography and mapping basics to engage and introduce students to the world of spatial data. Students use AGOL, learn map reading, design & interpretation, and complete two projects at end of quarter-- a choropleth multivariable map and web map/map series to create a web app
- GIST 12: introduces students to GIS via a series of projects using AGOL, QGIS, and ArcGIS Pro. Students learn map database basic connection, attributed queries, spatial queries, and mobile data collection
- GIST 52: Introduction to common spatial data models and structures.
  - Labs using ArcGIS Pro
  - Raster, vector, TIN, domain-specific
  - Datum, projections, general coordinate systems
  - City Engine
  - Editing and Topology
  - Data Standards and Quality
- GIST 53 - advanced GIS course, continuation of 52
  - Learning advanced analysis methods in ArcGIS Pro
  - Some students enrolled in 53 took 52 in 2019 when it was still taught with ArcMap
- GIST 54A - GIST seminar. Students pick and choose 12 hours worth of live webinars and conferences to attend and submit summaries to share with classmates. Includes Interview with GIS Professional.
- GIST 58 - Remote sensing. Students use QGIS and learn about optical/radar remote sensing. Learn to find, download, process satellite images, enhance and compare images to understand land cover and use change over time. Culminates in independent research project that includes a research paper and presentation.

Allison requests feedback on the core curriculum. Board members collaborate on Google Jamboard for key topics to cover in GIS Certificate, see Jamboard.

During collaboration, Allison notes that there were many responses related to programming and data structure. Discussion ensues about the level of programming awareness and skills that should be covered. Stace asserts that data is getting larger and backend work requires at least an awareness of coding. Simple coding skills are valuable. Adam shares that internship applicants often understand how to perform tasks but do not understand how or why it is used. John states that coding and programming skills should be demystified so that students can understand the value and eventually self-motivate to learn more.

The discussion moves onto the topic of communication skills. Tobias notes that English proficiency is not covered in certification courses. Cindy describes the ability to create well-communicated story maps & project packages to be as important as technical skills. Steve suggests, from a government standpoint, that assets will not be able to grow much, leading to the desire to hire employees that can do a lot with a diverse skill set in both technical know-how and communication. Garrett recommends framing classes in terms of individual career direction early on.

Enrollment & student success

Allison discusses the challenges of teaching online. Any student at Foothill has access to ArcGIS Pro, but requires a robust, stable internet connection or "gaming" computer. Low-income students have a significantly lower class success rate. Allison hypothesizes this is due to a lack of access to technology.

	2017-18	*2018-19*	*2019-20*	*2020-21*
Enrollment	79	266	280	385

Success rate (C or better)	77%	70%	65%	--
Degrees/Certificates awarded	7	8	14	--

Allison took a poll, "How did your organization do GIS during 2020?" Results: 94% worked from home.

Board members collaborate on second Google Jamboard "How did your organization do GIS virtually?", see Jamboard. Stace's organization has 1,500 lab machines loaded with resources, assigned randomly through SSO for students, with high end lab machines loaned out to grad students. Amber describes USGS pushing towards enterprise so that employees are not on VPN.

Discussion shifts to working around internet issues. Steve suggests providing students with a paid connection or establishing a partnership with a local provider. Teresa notes campus is working on access. Can give students high end devices, but internet access is harder. Hot spots have been given out. Administration is also looking to bring students back on campus to use wifi. Allison mentions working with tutorial center to add a computer lab with high powered machines.

Allison continues with slide presentation and commends the faculty's adoption of integrated and interactive online teaching tools.

Curriculum Changes

Allison shows a table of class enrollment for the core curriculum, see slides. 88% capacity is the ideal from a college budget standpoint. There are currently multiple sections of GIST 11 and 12, from which students are filtered down to two sections of GIST 52 and one section of GIST 53.

Allison describes curriculum course sequence and the three levels of certifications. Allison asks, "What job titles would you see associated with each certification level?" Board members collaborate on Google Jamboard "job titles", see Jamboard. General consensus is that minimum qualifications for most jobs and internships limit hiring to AS or Bachelors degree. John notes that students in the program are able to apply as a paid student intern with Santa Clara county even if they have an undergraduate degree.

Marketing & Outreach strategies

Allison requests input for expanding the market. Three student types are detailed:

- Sue student: upskilling professional, not comfortable with "self teaching"
- Sid student: ugrad or recent grad, supplementing current path
- Sam student: upskilling computer professional w/ advanced programming skills

Foothill college is paid bonuses by the state of CA for every certification awarded. Working with OTI and CalWorks -- are there other populations to consider? Amber notes that rural communities are limited to what they are exposed to in a career perspective. They are a subgroup of people recently given chromebooks due to COVID that can be reached out to online. Teresa recommends targeting high schoolers, asks how to explain to students what GIS is succinctly. Cindy agrees and also mentions working with indigenous communities. Cindy also mentions that any ties to a community would involve building trust. Steve suggests contacting end-users (fire service, police) and increasing their familiarity, possibly by teaching GIS in their programs. Allison notes that other departments at Foothill (photography, biology) are asking about AGOL and hopes the department can continue to work on this.

Discussion ensues about the difficulty of marketing GIS. Tobias observes that geography & GIS is hard to see

a career path in. Low income students are facing issues that occur in other STEM majors -- retention is bad. Amadea notes that opportunities related to GIS often do not mention "geography" or "GIS" in the job title and that GIS doesn't fit in one bucket. Stace agrees and notes that students are not looking into GI science as a career, but more as a set of skills or tools to deal with specialized data sets they can leverage into their own research or business ideas. Teresa suggests creating one unit introductory class catered to high schoolers, as most cannot commit to a 4 unit course. Board members collaborated on a Marketing & outreach Jamboard, see Jamboard.

Software

Allison took a poll, "What software platforms does your organization use?" Results:

- Arcgis online/Pro - 73%
- Other - 53%

Program Learning Outcomes

Allison took a poll, "Do the program learning outcomes need to be updated/revised?" Results: 87% no, 13% yes. Angela suggests adding a clause that describes a student being able to identify a problem to which industry standard GIS software could be applied.

Allison thanked board members and students for attending, and asked for any remaining comments or questions. Jan suggested the addition of a course practicum to the curriculum in order to teach both communication and project management skills. Amber notes that the GIST 53 project originally served this role, but has had to be reimagined due to an uptick in enrollment. Steve suggested bringing back the internship program. Allison encouraged thinking outside the box to connect students to internships outside of a 4 unit class.

Meeting end time: 3:15pm


GIST 11Topics to cover
Cover in another class
Should we do this?
Fundamental
motivated to self learn, troubleshoot
database architecture
metadata styles, standards
GIS Program management - How to administer a large scale GIS program (Picking and maintaining a framework, developing technical programs, etc) ADVANCED COURSE
Database design to match questions in need of answers
automation
exploratory data analysis with maps & charts
Data Lifecycles
Technical skill to manage backend of GIS enterprise systems (Ex. tracking and applying patches, maintaining servers, etc)- ADVANCED COURSE - Capstone for technical program?
Frontiers
Perspective/Drone Imagery
Critical Thinking and Spatial Reasoning
Cartography
Data/database design > end result
More Earth Engine!
Spatial SQL
508 compliance - what it means for ADA access to maps/apps
ML/AI RGB Imagery Classification
3D GIS / 3D Modelling
detail-focused map layout and cartographic choices
Digital Storytelling
Using Story Maps
databases
Python
Photogrametry
Project management
BI Tools - Tableau
Drone image processing
New Data Types: Voxel and 3D Solids
Adobe Illustrator with MAPublisher extension or Esri
comprehension of IDE, API, SDK notions as they pertain to GIS
Ability to communicate complex concepts
Configuring simple web apps
live stream data (social media, internet of things, etc)
Basic Project management - managing a project from start to finish
Embedding web maps/ Basic HTML webpage editing
Light project management - How to take an idea and build a solution (Basic)
3D GIS modelling (indoors and outdoors)
chema uration
ML/AI Based LiDAR Classification
spatial statistics
Ability to read and interpret maps
sponge for learning new
APIs
curate data standard documentation, for re-use by data stewards
Basic web-based spatial data architectures & services: WMS, WFS, COG, etc...
SQL, Python, R, Javascript for spatial
Google EarthEngine!
Allow students to take intro class in other discipline (city government, police services, anything that can benefit from GIS) for elective credit and to learn more about these other fields and how to
scripting
Advanced, but still fundamental
field data collection and dashboards

GIST 12 topics

Covered in detail

Critical Thinking and Spatial Reasoning

Cartography

detail-focused map layout and cartographic choices

sponge for learning new

Digital Storytelling

motivated to self learn, troubleshoot

Light project management - How to take an idea and build a solution (Basic)

Using Story Maps

Basic Project management - managing a project from start to finish

ver

Covered at a basic level with the idea of more in depth later

database architecture

Data Lifecycles

databases

Ability to communicate complex concepts

spatial statistics

Embedding web maps/ Basic HTML webpage editing

Configuring simple web apps

exploratory data analysis with maps & charts

live streamr. data (social media, internet of things, etc)

Python

Cover in another class

schema curation

automation

scripting

Python

Spatial SC

Database design to match questions i eed of nswers

Project management

508 compliance - what it means for ADA access to maps/apps

3D GIS / 3D Modelling

field data collection and dashboards

Photogrametry

metadata styles, standards

Ability to read and interpret maps

ML/AI RGB

APIs

Adobe Illustrator with MAPublisher xtension or sri

comprehension of IDE, API, SDK notions as they pertain to GIS

Google EarthEngi

ML/AI Based LiDAR Classification

chnical skill to anage backend of S enterprise stems (Ex. tracking d applying patches, aintaining servers, etc)- ADVANCED COURSE - Capstone for technical program?

SQL thon, R, vascript tial

Data/database design > end result

curate data standard documentation, for re-use by data stewards

Perspective/Drone Imagery

ore Earth Engine!

Drone image processing

Should we cover this?

Basic web-based spatial data architectures & services: WMS, WFS, COG, etc...

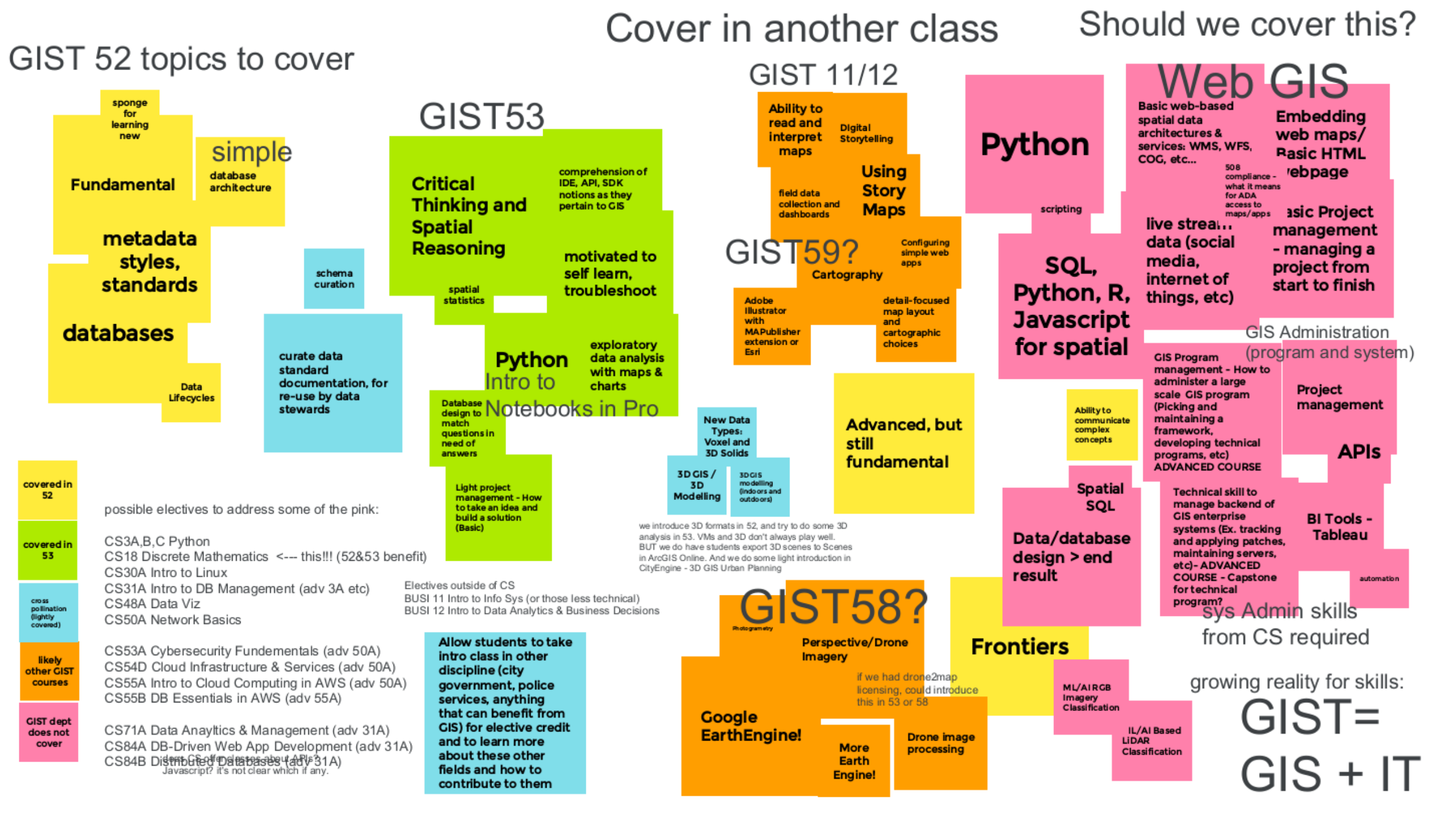
GIS Program management - How to administer a large scale GIS program (Picking and maintaining a framework, developing technical programs, etc) ADVANCED COURSE

3D GIS modelling (indoors and outdoors)

New Data Types: Voxel and 3D Solids

Allow students to take intro class in other discipline (city government, police services, anything that can benefit from GIS) for elective credit and to learn more about these other fields and how to contribute to them

BI Tools - Tableau


GIST 52 topics to cover
sponge for learning new
Fundamental
simple
database architecture
metadata styles, standards
databases
Data Lifecycles
schema curation
curate data standard documentation, for re-use by data stewards
GIST53
Critical Thinking and Spatial Reasoning
comprehension of IDE, API, SDK notions as they pertain to GIS
motivated to self learn, troubleshoot
spatial statistics
Python
exploratory data analysis with maps & charts
Intro to Notebooks in Pro
Database design to match questions in need of answers
Light project management - How to take an idea and build a solution (Basic)
Cover in another class
GIST 11/12
Ability to read and interpret maps
Digital Storytelling
Using Story Maps
field data collection and dashboards
GIST59?
Cartography
Configuring simple web apps
Adobe Illustrator with MAPublisher extension or Esri
detail-focused map layout and cartographic choices
New Data Types: Voxel and 3D Solids
3D GIS / 3D Modelling
3D GIS modelling (indoors and outdoors)
we introduce 3D formats in 52, and try to do some 3D analysis in 53. VMs and 3D don't always play well. BUT we do have students export 3D scenes to Scenes in ArcGIS Online. And we do some light introduction in CityEngine - 3D GIS Urban Planning
Advanced, but still fundamental
GIST58?
Photogrametry
Perspective/Drone Imagery
if we had drone2map licensing, could introduce this in 53 or 58
Google EarthEngine!
More Earth Engine!
Drone image processing
Frontiers
ML/AI RGB Imagery Classification
IL/AI Based LiDAR Classification
Should we cover this?
Web GIS
Basic web-based spatial data architectures & services: WMS, WFS, COG, etc...
Embedding web maps/ Basic HTML webpage
508 compliance - what it means for ADA access to maps/apps
Python
scripting
SQL, Python, R, Javascript for spatial
live stream data (social media, internet of things, etc)
Basic Project management - managing a project from start to finish
GIS Administration (program and system)
GIS Program management - How to administer a large scale GIS program (Picking and maintaining a framework, developing technical programs, etc) ADVANCED COURSE
Project management
APIs
Ability to communicate complex concepts
Spatial SQL
Data/database design > end result
Technical skill to manage backend of GIS enterprise systems (Ex. tracking and applying patches, maintaining servers, etc)- ADVANCED COURSE - Capstone for technical program?
BI Tools - Tableau
automation
sys Admin skills from CS required
growing reality for skills:
GIST= GIS + IT
covered in 52
covered in 53
cross pollination (lightly covered)
likely other GIST courses
GIST dept does not cover
possible electives to address some of the pink:
CS3A,B,C Python
CS18 Discrete Mathematics <-- this!!! (52&53 benefit)
CS30A Intro to Linux
CS31A Intro to DB Management (adv 3A etc)
CS48A Data Viz
CS50A Network Basics
CS53A Cybersecurity Fundementals (adv 50A)
CS54D Cloud Infrastructure & Services (adv 50A)
CS55A Intro to Cloud Computing in AWS (adv 50A)
CS55B DB Essentials in AWS (adv 55A)
CS71A Data Anayltics & Management (adv 31A)
CS84A DB-Driven Web App Development (adv 31A)
CS84B Distributed Databases (adv 31A)
does CS offer classes about APIs? Javascript? it's not clear which if any.
Electives outside of CS
BUSI 11 Intro to Info Sys (or those less technical)
BUSI 12 Intro to Data Analytics & Business Decisions
Allow students to take intro class in other discipline (city government, police services, anything that can benefit from GIS) for elective credit and to learn more about these other fields and how to contribute to them

GIST 58 topics to cover

sponge for learning new

Fundamental

Advanced, but still fundamental

Ability to read and interpret maps

Critical Thinking and Spatial Reasoning

motivated to self learn, troubleshoot

Ability to communicate complex concepts

detail-focused map layout and cartographic choices

Google EarthEngine!

More Earth Engine!

ML/AI RGB Imagery Classification

ML/AI Based LiDAR Classification

intro to scripting

Frontiers

Drone image processing

Perspective/Drone Imagery

automation

Cover in another class

GIS Program management - How to administer a large scale GIS program (Picking and maintaining a framework, developing technical programs, etc)

schema curation

Basic web-based spatial data architectures & services: WMS, WFS, COG, etc...

metadata styles, standards

Configuring simple web apps

Spatial SQL

field data collection a dashboards

Using Story Maps

database architecture

Data/database design > end result

exploratory data analysis with maps & charts

APIs

comprehension of IDE, API, SDK notions as they pertain to GIS

Embedding web maps/ Basic HTML webpage editing

databases

Python

SQL, Python, R, Javascript for spatial

Technical skill to manage backend of GIS enterprise systems (Ex. tracking and applying patches, maintaining servers, etc)- ADVANCED COURSE - Capstone for technical program?

Cartography

Database design to match questions in need of answers

Should we cover this?

508 compliance - what it means for ADA access to maps/apps

DIgital Storytellir

curate data standard documentation, for re-use by data stewards

Adobe Illustrator with MAPublisher extension or Esri

Allow students to take intro class in other discipline (city government, police services, anything that can benefit from GIS) for elective credit and to learn more about these other fields and how to contribute to them

3D GIS modelling (indoors and outdoors)

Data Lifecycles

New Data Types: Voxel and 3D Solids

Project management

Basic Project management - managing a project from start to finish

Photogrametry

BI Tools - Tableau

Light project management - How to take an idea and build a solution (Basic)

live stream data (social media, internet of things, etc)

spatial statistics

Job titles

Our City won't hire anyone without an AS :-(

Certificate 1

Biological Information Specialist

certificate 2

Certificate 3

GIS Technician

Field Data Collector

GIS Technician

GIS Technician I/II/III

GIS Technician

Associate GIS Analyst (needs 1 year of experience) & undergraduate degree

GIS Specialist

GIS Analyst

GIS Technician

Developer

Metadata Specialist

GIS Intern

GIS Intern

Spatial data analyst

GIS Technician

GIS Intern

Asset Management Tech

GIS Analyst

Research scientist

Marketing & outreach

Where do we advertise?

Instagram & SnapChat - Maybe the GIST Club Could participate in this Marketing angle?

How do we advertise?

Target technical staffing firms for Apple/Google/Facebook who hire hundreds of GIS technicians to advertise your program. Many of their new hires are good candidates for GIST

Overlooked markets?

Twitter

Advertisements at the three area airports. Lots of people just waiting around - many 'eyeballs' to read the ads

Active Alumni Network

Using a dedicated Social Media and. Communications Coordinator

improve website. Feature student stories, stories of internships with integrated companies/govs. photos!

Make a big deal of GIS day and week on campus.

<<<-----THIS

People on the autism spectrum

LinkedIn

Professional societies (SCGIS, AGU, ASPRS, etc.)

VTA Bus banner!

Short video

Rural Communities

SQL Server Mgmt Studio

Meetup

Happy Hallow Park and Zoo

Software: R, SSMS

Paint a map on your parking lot so it can be seen from space.

Other software: Adobe Illustrator, MAPublisher, Fulcrum, Geocortex Essentials

R, CLI stuff from Github, Kepler.gl, Jupyter & other Python Notebook platforms, more R... Google Earth Engine

CHEF, Cookbooks, Git