SAN JOSÉ STATE UNIVERSITY
URBAN AND REGIONAL PLANNING DEPARTMENT
SUMMER 2020
ENVS/URBP-179A: FUNDAMENTALS OF GEOGRAPHIC INFORMATION SYSTEMS FOR URBAN PLANNING

Instructor	Rick Kos, AICP
Email	Richard.Kos@sjsu.edu
Office hours	Wednesdays (11:00 – 1:00 p.m.) and Thursdays (2:00 p.m. – 4:00 p.m.) Appointments strongly preferred. Sign up here: https://goo.gl/pEvVod
Class days/time	Tuesdays and Thursdays 5:00 p.m. – 9:00 p.m.
Zoom link for class meetings	https://sjsu.zoom.us/j/96476536837
Class website	All course material available on Canvas
Prerequisites	No prior knowledge of GIS is required to take this course; however, there is a lot of material to cover and this will be a fast-moving and technology-centric course. A strong motivation to learn, explore and have fun with computer applications is essential. This course will require a significant amount of independent work and relies heavily on student initiative.
Units	4 units

Course Catalog Description

Exploration of Geographic Information Systems (GIS) area analysis techniques for spatial information management in local government: planning support systems, needs analysis, envisioning neighborhoods utilizing multiple maps, charts, photos and the Internet. Course may be repeated for credit when topic changes. Prerequisite: Upper division standing or instructor consent.

Course Description

Geographic Information Systems, GIS, is a rapidly evolving technology involving the study of the spatial (geographic) location of features on the Earth's surface and the relationships between them. This course exposes students to the use of GIS technology for exploring multi-faceted urban planning topics. By completing the course you will possess the fundamental GIS skills used by contemporary urban planners.

Environmental Systems Research Institute's (Esri) suite of GIS software has become the industry standard and is used by a majority of government agencies and private firms engaged in GIS activities. For that reason, Esri tools will be the focus of this course, though there are a number of free, open-source tools worth exploring such as QGIS.

San José State University's Urban and Regional Planning Department offers four courses specifically devoted to GIS: (1) the course you are taking now; (2) URBP-275G: GIS Overview; (3) URBP-278: Introduction to GIS for Urban Planning; and (4) URBP-279: Advanced GIS for Urban Planning.

This course strives to provide a balance between the "how-to" of using Esri GIS tools and the "why" of GIS by explaining the roles GIS technology plays in analyzing local and regional (even global) problems. During the first part of the course, you will learn the specific steps necessary to navigate the ArcGIS Online Map Viewer, acquire and manage geographic data sets, and query the data to answer typical planning-related questions. For some exercises, you will use real geospatial data from Bay Area cities, "warts and all", in order to learn how to overcome typical problems encountered by GIS practitioners. Next, we turn our attention to the Community Analyst and Story Map platforms.

The last part of the course will focus on the development, execution and presentation of a web mapping application. A key objective of the final project is to provide you with a product that you can present to current and future employers as evidence of your GIS abilities. I am continually impressed by the work that beginning learners produce for their final projects!

I am looking forward to helping you learn GIS tools. There are many avenues for assistance and to accelerate your understanding of GIS: in-class exercises and personal guidance from me, at least four office hours per week, and the ability to reach me via e-mail (I typically reply to clearly worded messages very quickly). There is a lot of work to complete in this course, but I'm here to help you succeed – and we'll have some fun, too.

Course Learning Objectives

Upon successful completion of the course, you will be able to:

1. Describe how contemporary urban planners use GIS as a tool for the analysis and display of quantitative data such as demographic information from the US Census Bureau;

2. Utilize the core components and functionality of the ArcGIS Online Map Viewer;

3. Utilize Esri Community Analyst to undertake detailed demographic and consumer spending analysis at multiple scales;

4. Conduct strategic attribute and spatial queries using geospatial datasets;

5. Conceptualize, design, and execute an interactive web mapping application;

6. Prepare a Story Map that integrates spatial data and supporting mixed-media materials;

7. Utilize geoprocessing tools to transform geospatial datasets into new ones.

Planning Accreditation Board (PAB) Knowledge Components

This course partially covers the following PAB Knowledge Components:

2b) Written, Oral and Graphic Communication: ability to prepare clear, accurate and compelling text, graphics and maps for use in documents and presentations.

2c) Quantitative and Qualitative Methods: data collection, analysis and modeling tools for forecasting, policy analysis, and design of projects and plans.

A complete list of the PAB Knowledge Components can be found at http://www.sjsu.edu/urbanplanning/courses/pabknowledge.html.

Required Course Text and Software

No textbook is required. All course materials will be available on Canvas.

Recommended Readings and Materials

Brewer, Cynthia A. *Designing Better Maps: A Guide for GIS Users.* Redlands, CA: Esri Press, 2015. ISBN: 9781589484405

Al-Kodmany K. "Using Visualization Techniques for Enhancing Public Participation in Planning and Design: Process, Implementation, and Evaluation", *Landscape and Urban Planning* 45, no. 45 Issue 1, September 1999.

"GIS Best Practices: GIS for Urban and Regional Planning", Esri white paper, January 2011. http://www.esri.com/library/bestpractices/urban-regional-planning.pdf (accessed July 3, 2012)

Nedovic-Budc, Zorica. "Geographic information Science implications for Urban and Regional Planning", *URISA Journal,* Vol. 12, No. 2, Spring 2000. http://www.urisa.org/files/BudicVol12No2-7.pdf (accessed July 3, 2012)

Peterson, Gretchen N. *GIS Cartography: A Guide to Effective Map Design.* Boca Raton, FL: CRC Press, 2009.

Rantanen, Heil. "Tools to Facilitate Housing and Urban Processes: Mapping and Managing Local Knowledge", paper presentation at 2007 ENHR International Conference, Rotterdam. http://www.enhr2007rotterdam.nl/documents/W21_paper_Rantanen.pdf (accessed July 3, 2012)

Fundamentals for Success in this Course

I will make every effort to help you succeed in this course so that you can use Esri GIS tools confidently and successfully in your future career endeavors. Naturally, it is your responsibility to complete all assignments and to take advantage of the many learning opportunities this semester. Your final grade will reflect your overall commitment to learning; highest grades correlate with student efforts that exceed average expectations of quality and thoroughness. Here are some tips to help you succeed this semester:

Maintain a fast pace: This will be a fast-moving and somewhat technologically advanced course, but concepts and instructions will be explained as clearly as possible. If you wish to evaluate your readiness for this course at the outset, please see me as soon as possible.

Computer competencies: Competence with the Windows operating system is expected, including the storing, copying and management of multiple data types; managing multiple windows and applications; and techniques for saving work frequently.

Enjoyment of Learning: A strong motivation to learn, explore and have fun with computer applications is essential. This course will require a significant amount of independent work and relies heavily on student initiative. A sense of humor with computer "headaches" is helpful, too!

Seek Help Effectively: Since GIS practitioners and urban planners are problem-solvers at their core, it is important that you adopt a problem-solving mindset in this course. Asking for assistance this semester is encouraged and signals to me that you are engaged in your work, motivated by excellence, and positively challenged by the assignments.

Asking for help will never be perceived as a liability in my class. However, when seeking assistance, it is important for you to (1) clearly communicate the problem and (2) demonstrate that you have attempted to solve the problem on your own and are ready to document your attempts. I am very happy to help you with your work outside of class meetings, during office hours or via email. If we work together via email, it is vital that you send me as much information as possible to help diagnose the problem. It is not sufficient to write to me and vaguely state, "I can't get this to work" and expect useful assistance without also including relevant screen captures and a description of the solution steps you've tried.

In general, I will be very responsive to queries that meet these criteria and much less so for "lazy queries", which I probably will not have the inclination to address quickly. This approach mirrors professional practice since supervisors expect valued employees to be proactive in solving problems.

Focus and Respect: I fully understand the temptations and distractions we all face today with email, websites, Twitter, Facebook and text messages vying for our attention, but if you have to "get something else done" during the class period, please do it elsewhere. Mobile phones need to be in silent mode, or turned off.

Professional Conduct: I conduct this course in a manner that mirrors professional practice in order to help you develop valuable workplace skills. We all need to be in agreement that the following standards will apply, as listed in the two sections below.

Instructor Responsibilities

- To create a physically and intellectually safe and stimulating environment for learning
- To assist students as much as possible with their individual and collective learning goals
- To help resolve conflicts that hinder learning by answering student questions clearly and promptly, or to research answers and reply to the student as soon as possible
- To treat students with respect and kindness, using encouragement and humor to foster learning
- To arrive at the start of each class session fully prepared and organized, with clear learning objectives and a schedule for the day's tasks ready to go
- To evaluate and grade student work fairly and accurately while providing constructive feedback

Student Responsibilities

- To attend each class session and to arrive punctually, bringing all needed materials
- To treat other students and the instructor with absolute respect, supporting fellow students whenever possible with their learning objectives, and minimizing distractions in class
- To complete all assignments on time and professionally according to the requirements listed in this syllabus
- To fully read and understand all aspects of this syllabus and to carry out the requirements herein
- To actively and consistently participate in class discussions and question-and-answer sessions
- To demonstrate self-reliance and self-direction in setting and completing learning objectives
- To accept responsibility for working collaboratively in the learning process

Course Assignments and Grading Policy

Your grade for the course will be based on the following assignments and other components. All relevant materials and assignment details will be posted to Canvas.

Assignment (assignment descriptions follow this table)	Percent of Total Course Grade	Course Learning Objectives Covered
A – Map and data queries with ArcGIS Online Map Viewer	15%	1, 2, 4, 7
B – Demographic data mapping and analysis with Community Analyst	20%	1, 3
C – Produce an Esri Story Map	20%	6
D – Produce an interactive web mapping application *(One-credit professional engagement unit)*	25%	5

Three Quizzes	15%	1-7
Participation – Consistent, active, well-prepared, and measureable engagement in lectures and reading discussions, small team tasks, and presentations in class	5%	

Assignment A will introduce students to the principles of working with geospatial, location-based data using the ArcGIS Online Map Viewer. Students will examine datasets of relevance to demographic analysis and related urban planning topics. Additionally, students will gain practice in obtaining data from online data portals and incorporating it into their ArcGIS Online account for further analysis. This assignment will allow students to work with the type of data and maps commonly used by urban planners, thereby building valuable geospatial skills.

Assignment B provides students with exposure to Esri's Community Analyst cloud-based mapping application. Community Analyst contains a wealth of demographic and consumer/business data of great value to analyses undertaken during the community assessment phase of work undertaken by urban planners.

Assignment C will provide time for students to develop an interactive Story Map which integrates a map-based platform with supporting material such as video, text, photos and other graphics.

Assignment D involves the conceptualization, development, and execution of an independent GIS project. The end product will be an interactive web mapping application hosted in student ArcGIS Online accounts. Students will present their finished application to the class on the final day of the course. Completion of Assignment D will constitute the professional engagement unit for this course since the tasks, in all respects, will mirror the process by which urban planners with GIS skills undertake a professional GIS project.

Three quizzes will reinforce the material covered during class lectures and in homework assignments.

Calculation of Final Course Letter Grade

I will calculate the final letter grade for the course by weighting the grade for each assignment according to the percentages in the table above. To do this, I first convert the letter grade for each assignment to a number using a 4-point scale (A+ = 4.33, A = 4.0, A- = 3.67, B+ = 3.33, B = 3.0, B- = 2.67, C+ = 2.33, C = 2.0, C- = 1.67, D = 1, and F = 0).

I then use these numbers and the weights for each assignment to calculate a final, numerical grade for the course based on a 4-point scale. That number is converted back to a letter grade (A = 3.85+, A- = 3.50 – 3.84, B+ = 3.17 – 3.49, B = 2.85 – 3.16, B- = 2.50 – 2.84, C+ = 2.17 – 2.49, C = 1.85 – 2.16, C- = 1.41 – 1.84, D+ = 1.17 – 1.40, D = 0.85 – 1.16, F = 0 – 0.84).

This grading scheme will not always be followed strictly since upward adjustment of the final course grade will be made if performance on one activity is an outlier (e.g. exceptionally low) or if the pattern of scores shows a significant improvement over time. If such adjustments are made, they usually result in about a half-letter grade improvement. Students are encouraged to meet privately with me early in the semester to discuss expectations.

Other Grading and Assignment Issues

I understand that grades are important to students on both a personal and professional level. They are a measure of your achievements in class and your progress towards meeting the course learning objectives. I also understand that there tends to be a great deal of "grade anxiety" in a university setting. The best way that I can help students with these matters is to be as clear as possible about grading criteria and weightings in this syllabus, so that you can plan accordingly. Please understand that I am a very thoughtful, careful, thorough

and fair grader of student assignments and it is a responsibility that I do not take lightly. You are encouraged to review your graded assignments with me at any time to discuss my comments and suggestions for improvement.

I've been called a "tough grader", and it's true! High grades must be earned and all grades reflect my comprehensive estimation of a student's effort - just as our efforts in a professional work environment are judged accordingly and considered by supervisors for promotions and pay raises. For example, I reserve a grade of "A" only for **exceptional** work, as a way of honoring students who go "above and beyond" when completing course assignments. After all, the strict definition of an "A" grade is "exceptional", not "average" or even "above average".

Occasional oopportunities for optional extra credit will be explained in individual assignment handouts that students can download from Canvas.

Final Examination or Evaluation

Assignment D, described on the previous page, will constitute the final examination for this course. The same assignment also serves as the one-credit, department-required "professional engagement unit" for this course.

Course Workload

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of forty-five hours over the length of the course (normally 3 hours per unit per week with 1 of the hours used for lecture) for instruction or preparation/studying or course related activities including but not limited to internships, labs, clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

Because this is a four-unit class, students can expect to spend a minimum of ten to fifteen hours per week in addition to time spent in class and on scheduled tutorials or activities. Special projects or assignments will require additional work for the course. Careful time management will help you keep up with readings and assignments and enable you to be successful in all of your courses.

Participation in Class and Attendance

Student participation in class discussions is a vital component of this course and students should make every attempt to attend all classes and actively participate in discussions. In cases where a student misses a significant number of lectures or does not actively participate in discussions, this will impact the final course grade. According to University policy F69-24, "Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to ensure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading."

Completing Assignments on Time and Professionally

Assignments are due at the date and time specified on each assignment handout. In only rare instances will late assignments be accepted, as described below. Late assignments will receive a one-letter grade deduction for each day an assignment is late. For example, if the assignment would normally receive a grade of "B" but is submitted one day late, it will receive a final grade of "C".

I realize that life happens. If you expect not to be able to complete an assignment on time, it is important for you to contact me **at least 24 hours prior to the due date** and, if appropriate, the other students in a group (for group project work). You must also provide a date and time by which the late assignment will be submitted. If you do not communicate an anticipated late assignment within this time frame or if the late assignment is not received on the date promised, the assignment will receive a grade of zero. The grading

policies described earlier in the syllabus will still apply. **A maximum of two late assignments that adhere to this policy will be accepted**; all subsequent late assignments will receive an automatic grade of zero. Sorry, no exceptions to these policies will be granted, in fairness to the majority of students who submit their assignments on time.

Since this course focuses on the development of professional skills used by urban planners, the presentation of submitted materials will be considered as part of the assignment's grade. For example, all assignments must include the student's name, date, course number, assignment number and other items as directed by the instructor. Neatness, clarity and organization do count. As in a professional setting, typed submissions are expected; handwritten assignments are not acceptable. Assignments not meeting these fundamental practices of professional presentation will generally receive a one-half to one-point deduction in the grade.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/

Plagiarism and Citing Sources Properly

Plagiarism is the use of someone else's language, images, data, or ideas without proper attribution. It is a very serious offense both in the university and in your professional work. In essence, plagiarism is both theft and lying: you have stolen someone else's ideas, and then lied by implying that they are your own.

> **Plagiarism will lead to grade penalties and a record filed with the Office of Student Conduct and Ethical Development. In severe cases, students may also fail the course or even be expelled from the university.**
>
> **If you are unsure what constitutes plagiarism, it is your responsibility to make sure you clarify the issues <u>before</u> you hand in draft or final work.**

Learning when to cite a source and when not to is an art, not a science. However, here are some common examples of plagiarism that you should be careful to avoid:

- Using a sentence (or even a part of a sentence) that someone else wrote without identifying the language as a quote by putting the text in quote marks and referencing the source.
- Paraphrasing somebody else's theory or idea without referencing the source.
- Using a picture or table from a webpage or book without reference the source.
- Using data some other person or organization has collected without referencing the source.

The SJSU MLK Library provides a short (15 minutes) and informative plagiarism tutorial. The MUP faculty highly encourage all students to complete it. Details are here:
https://libguides.sjsu.edu/c.php?g=853661&p=6111789

Also, the University of Indiana has developed a very helpful website with concrete examples about proper paraphrasing and quotation. See in particular the following pages:

- Overview of plagiarism at www.indiana.edu/~istd/overview.html
- Examples of plagiarism at www.indiana.edu/~istd/examples.html
- Plagiarism quiz at www.indiana.edu/~istd/test.html

If you still have questions, feel free to talk to me personally. There is nothing wrong with asking for help, whereas even unintentional plagiarism is a serious offense.

Citation style

It is important to properly cite any references you use in your assignments. The Department of Urban and Regional Planning uses Kate Turabian's *A Manual for Writers of Research Papers, Theses, and Dissertations*, 8th edition (University of Chicago Press, 2013, ISBN 780226816388). Copies are available in the SJSU King Library. Additionally, the book is relatively inexpensive, and you may wish to purchase a copy.

Please note that Turabian's book describes two systems for referencing materials: (1) "notes" (footnotes or endnotes), plus a corresponding bibliography, and (2) in-text parenthetical references, plus a corresponding reference list. **In this class, students should use the "notes" style** since I feel that it creates a less visually distracting experience for your reader than the parenthetical-reference style.

Library Liaison

The SJSU Library Liaison for the Urban and Regional Planning Department is Ms. Peggy Cabrera. If you have questions, you can contact her at peggy.cabrera@sjsu.edu or 408-808-2034.

About the Instructor: Rick Kos, AICP

I am very much looking forward to working with you this semester and expect that you will learn quite a bit in our few weeks together. We'll have some fun along the way, too. My goal is to teach you introductory GIS skills clearly, with minimal jargon and maximum time using the software to help you remain competitive in today's labor market.

Throughout my career using GIS, I have never strayed far from my roots in urban and regional planning and this combination of experience is what I am excited to share with you. I take pride in providing personal, one-on-one attention to the needs of my students and strongly encourage you to take advantage of all opportunities to participate during class and office hours.

My formal training is in environmental planning and urban design (B.S., Rutgers University, 1985) as well as regional planning and New Urbanism (Masters, University of North Carolina at Chapel Hill, 1995). In the late 1980s, I worked as a planner in Middlesex County, New Jersey, reviewing subdivision and site plan proposals for compliance with county regulations. In the 1990s, I served two rapidly growing North Carolina municipalities in a dual role as town planner and GIS coordinator (the latter being a role I created for both towns), so I am equally conversant in the language of both disciplines. From 1996 - 2000, I served as Senior Town Planner for Huntersville, North Carolina, the fastest-growing town of its size in the state at the time. The New Urbanist principles mandated by the Town's development regulations applied to both greenfield and infill sites. Since the regulations were design-based (i.e. non-Euclidean), they required me to make frequent subjective judgments on the visual qualities of streets, the orientation of proposed buildings to public spaces, and the relationship of buildings and land uses to one another. I thoroughly enjoyed defending the principles of traditional town planning, often to developers and citizens that were not particularly receptive to deviations from the conventional suburban planning model.

After relocating to the Bay Area in 2000, I worked with the Metropolitan Transportation Commission in Oakland as a GIS Analyst. The Bay Area Lifeline Transportation Map that I completed for MTC was chosen from among thousands of entries for inclusion in Esri's *2003 Map Book*. This annual publication showcases innovative uses of Esri's GIS software to solve real-world problems. The Lifeline Map locates disadvantaged neighborhoods and thousands of geocoded essential destinations (e.g. grocery stores, daycare centers, clinics) within the nine county region, along with existing public transit services. The spatial analyses enabled by this mapping work allowed transportation planners to locate gaps in transit service so that decision-makers could direct funding to alter bus schedules, connections, and routing for improved neighborhood connectivity.

From 2003 to 2007 I served as GIS Manager for Design, Community & Environment, a planning and design firm in Berkeley. I managed all aspects of the firm's GIS practice and took great pride in keeping hundreds of

data layers organized across multiple projects, ensuring that the firm's metadata was up-to-date, training staff to use ArcGIS and ArcCatalog, and managing the production of hundreds of maps for General Plans and EIRs throughout California.

I also manage the GIS Education Center for a non-profit organization called BayGeo. Additionally, I have co-authored a book titled *GIS for Economic Development* with Professor Mike Pogodzinski of the SJSU Economics Department, released in late 2012 by Esri Press. I also engage in a number of freelance GIS projects, including transit planning analyses for Mobility Planners, LLC and the development of interactive webapps.

I've been teaching at San José State since 2007 and, I must admit, it is my favorite job of those listed above. **Welcome!** Let's work hard and have fun! I'm here to help you succeed with GIS.

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SUMMER 2020 COURSE SCHEDULE

The following course outline describes the general approach we will take this semester, but specific details are subject to change with reasonable notice. I will communicate changes via email and verbally in class.

Date	Topic	Assignment and Quiz Due Dates
Tuesday **June 02**	**Getting Started** - Course and syllabus overview. - What is GIS and ArcGIS Online? - How do contemporary urban planners use GIS for research and in the professional workplace? - Overview of Assignment A.	
Thursday **June 04**	**Geospatial Explorations with ArcGIS Online Map Viewer** - Practice fundamental concepts: spatial relationships, querying data, basic geoprocessing tools. - Work with open data portals.	
Tuesday **June 09**	**Study Urban Populations with Esri's Community Analyst** - Explore a powerful, cloud-based mapping platform brimming with business, consumer spending, and demographic data. - We'll use Community Analyst to explore a Bay Area city of interest to you as we prepare for Assignment B.	Assignment **A** *(ArcGIS Online exercises)*
Thursday **June 11**	**Community Analyst Part 2** We'll continue exploring Community Analyst and its wealth of data for urban planning applications. **Explore 3D Analysis using ArcGIS Scene Viewer** A short exercise to whet your appetite for the 'cool factor' of 3D analysis as it pertains to urban and environmental planning.	--- QUIZ #1 ---
Tuesday **June 16**	**Explore Esri Story Maps** - Story Maps are a fun way to link geographic information and maps with other narrative material (text, videos, photos, etc.) and produce an immersive, interactive experience. - We'll explore the Story Maps platform to help you develop ideas for completing Assignment C.	Assignment **B** *(Community Analyst exercises)*
Thursday **June 18**	**Create and Share an Online Covid-19 Data Dashboard** - Operations Dashboard is a configurable web application that provides location-aware data visualization and analytics for a real-time operational view of people, services, assets, and events. - We'll use Dashboard to map real-time Covid-19 data. You'll be able to share the resulting interactive dashboard online.	--- QUIZ #2 ---

Date	Topic	Assignment and Quiz Due Dates
Tuesday **June 23**	**Apply Your Skills: Bay Area City Analysis (Part 1)** - This and the next two class sessions will move us towards completing Assignment D. - Using a Bay Area city and relevant geospatial datasets as a case study, you'll ultimately develop an interactive web mapping application that focuses on the selected city in some fashion.	Assignment **C** *(Esri Story Map exercises)*
Thursday **June 25**	**Apply Your Skills: Bay Area City Analysis (Part 2)** - Today we will build upon our work in the selected city by exploring Esri's WebApp Builder. - By the end of the class period each student will determine a final project (Assignment D) approach using data for the selected city.	--- QUIZ #3 ---
Tuesday **June 30**	**Open Work Session and Course Skills Review** - This class meeting will be a great opportunity to advance, test, and solicit peer feedback of your evolving web mapping application.	
Thursday **July 02**	**Presentation of Completed Web Mapping Application** - This is your opportunity to display and share your finished web mapping application! - We'll finish the course with a wrap-up discussion and course review along with a glimpse of URBP-278 and URBP-279 for students interested in further developing their GIS skills.	Assignment **D** *(Web Mapping Application)*