

**SURV 56 -- INTRODUCTION TO SATELLITE-BASED  
LAND SURVEYING METHODS**  
**Course Syllabus (v1a) - SPRING 2020, Sec. 5823**

**Program and Instructor Web Pages:**

[Reg Parks SRJC Web Page](#)  
[CESGT Program Web Page](#)  
[Civil Engineering Certificate Web Page](#)  
[Geospatial /GIS Certificate Web Page](#)  
[Land Surveying Certificate Web Page](#)

**Instructor: Reg Parks**

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Email: [rparks@santarosa.edu](mailto:rparks@santarosa.edu)

Lect: T 8:00 AM - 11:00 PM, Kunde 151

Lab: T 12:00 - 3:00 PM, Kunde 151

**Office Hr: T 3:00-4:00 PM, Kunde 151**

**WELCOME TO SURV 56 !!!**

**Lectures and Laboratory:** Lectures will comprise approximately three (3) of the six (6) weekly course hours with the remainder devoted to laboratory activities. This may vary on rare occasion depending on student progress, specific class activities/projects and weather conditions.

**Mandatory Final Exam:** Students should plan on delivering an oral presentation with a written summary on the final exam date for this course; currently scheduled for **Tuesday, May 21st from 7:00 AM to 9:45 AM** (tentative)

<b>Survey 56 - Required Course Text:</b> 1.) <u>GPS for Land Surveyors</u> , Jan Van Sickle, CRC Press, 4rd Edition, 2015 <b>(rent or buy)</b>	2.) GPS Library Folder (on network drive)
<b>Survey 56 – Recommended / Course Reference Materials:</b> 1.) <u>Elementary Surveying: An Introduction to Geomatics</u> , Paul R Wolf, Charles D Ghilani Prentice Hall, 14th Edition, 2014 <b>(recommended)</b>	3.) Introduction to Geometrical and Physical Geodesy, Thomas Meyer,, ESRI Press, 3rd Edition, 2010 <b>(recommended)</b>
	4.) Equipment Information binders in lockers.
	5.) SRJC Doyle Library Reserve Section

**Additional Recommended Advanced Outside Reading: *OPTIONAL!!!***

1.) <u>Adjustment Computations Spatial Data Analysis</u> , Charles D. Ghilani, Paul R. Wolf Wiley Press, 5th Edition, 2010	2.) <u>Elementary Statistics for Geographers</u> James E. Burt, Gerald M Barber, David L. Rigby, Guilford, 3rd Edition, 2009
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**SRJC Land Survey Technology Certificate Program & Career Technical Education (CTE)**

Students enrolled in the SRJC Land Surveying Technology Certificate Program must complete all coursework with a grade of C or higher to advance and to qualify for a Certificate. Students should begin immediately by establishing their certificate candidacy in their cubby under "District Announcements" use the "Degree Audit Available" link.

Additional Info: [https://portal.santarosa.edu/SRWeb/SR\\_ViewAnnouncement.aspx?Type=2&AnnouncementID=5](https://portal.santarosa.edu/SRWeb/SR_ViewAnnouncement.aspx?Type=2&AnnouncementID=5)

**SURVEY 56 COURSE OUTLINE CONTENT:**

**Student Learning Outcomes:**

Upon completion of this course, student will be able to:

1. Identify multiple types of Global Positioning Systems (GPS) & Global Navigation Satellite Systems (GNSS).
2. Properly set up and operate GPS/GNSS receivers for the recording of data.

3. Process and adjust GPS/GNSS data using post processing software.
4. Describe and apply different types of coordinate reference systems with respect to datum type, epoch date and projection systems.
5. Complete accurate summaries and reports using GPS/GNSS data.

**Objectives:**

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

1. Identify types of control surveys and their applications in civil engineering and land surveying.
2. Operate both navigation grade and survey grade GPS/GNSS equipment for determining location.
3. Use conventional electronic surveying instruments (total stations) as well as the GPS equipment for control and topographic surveys, navigation, staking and mapping.
4. Determine and utilize appropriate field procedures for horizontal and vertical control of surveys.
5. Define, apply and provide illustrative examples of map projections and their associated data.
6. Determine the geographic coordinates and plane coordinates of points within the two California Coordinate Systems.
7. Summarize the use and setup of electronic surveying equipment such as total station global positioning systems.
8. Reduce, analyze, compile (post-process) and summarize GPS/GNSS land survey data using post-processing software.

**COURSE EXPECTATIONS:**

Survey 56 is designed to provide the fundamentals of Satellite-Based Land Surveying concepts and methods. Survey 56 emphasizes field data collection and related activities. Some attention will be given to coordinate systems, post collection data analysis components: QA/QC, vector processing, network adjustment theory and some advanced field methods. Online research, keyword searches and general web-browsing proficiency is required.

In Survey 56, students will explore the core aspects of GPS field data collection methods and mission planning within the context of preparing to become entry level GPS field technician. These core aspects are a part of the overall skills and behaviors necessary to successfully complete the 1-year certificate program.

A serious student attitude is strongly encouraged and a team learning approach underpins the course culture. A team learning approach is one where a student takes an equal (or better) measure of responsibility for their learning experience through their participation, performance and professional attitude.

**Class Preparation:**

Students are expected to arrive on time, to be prepared in advance for each class and to remain for the entire session. It is strongly recommended that students write down questions resulting from their SURV56 reading and assignments. Bring them to class for clarification.

Students are to have successfully completed SURVEY 60 and APTECH 191 (or equivalents) with a grade of C or better.

Students are expected to be familiar with microcomputer operations, Microsoft (MS) Windows and MS Windows file management, MS Windows Explorer, MS Internet Explorer, Adobe Acrobat Reader (free download), MS Notepad and MS Excel spreadsheet software. Tutorials are available on the SRJC campus. Please consult the campus website.

Access to a computer and to the internet is key to passing this course. If students require additional time beyond the allocated lab time to complete their assignments, there will be

scheduled open lab hours posted outside Kunde 111 and 151. In some cases, students with home computers or laptops will be able to install course software and work, at home, outside of class hours. All students should be proficient in correctly transferring class data to and from their own USB drives. Use of identical folder (directory) structure across all environments is required. Students are strongly recommended to purchase a USB drive of at least 16GB capacity by the second class meeting.

Please consult the SRJC Website and SRJC Academic Calendar to identify all important dates, deadlines and academic policies such as those relating to unexcused absences, adding and dropping. A course calendar/planner will be provided as well as SRJC administrative deadlines.

***Any student who feels that they have not met\*\* or cannot meet the requirements and expectations for this course should contact the instructor before the second class meeting. There are classes available that will help you prepare for this program.***

### **Attendance Issues:**

- Attendance is required for both lab and lecture hours. Your lack of attendance can affect your grade for this course. Class generally begins on the hour and ends at ten (10) minutes before the hour. Although excused absence may be granted by contacting your instructor sufficiently **prior** to the beginning of class, a “fairness” penalty will be assigned for missed labs. It is good practice to notify your instructor **by email** if you are going to be tardy or absent. Please remember, a lab group functions as individuals and as a team, absences compromise your team’s and your final grade in the course.
- Students are responsible for all material delivered in lecture and lab as well as the readings and assignments.

Students are responsible for correctly obtaining any missed lecture or laboratory course information from their fellow classmates. Please do not expect your instructor to provide personal email services for absenteeism or for failure to retrieve one’s files from the network drive.

- Your class participation can and will affect your final grade as will your class conduct.
- There will be no make-ups for missed class activities (labs, quizzes, exams, in-class demonstrations, etc).
- According to school policy, if a student misses over 10% of any course, they can be summarily dropped from the course.

### **Assignments:**

All assignments are to be completed and submitted as hard copy per instructions and are due at the beginning of class (BOC) on the assigned due date. Electronic copies (Word and PDF) should accompany all hard copy assignments and deposited on the network M:\ drive in the SURV56 sub-folder bearing the student name as directed by your instructor.

- All course deliverables shall be submitted on 8½" x 11" paper, in field books or on sheets provided to you by the instructor. Unless otherwise directed, all maps and diagrams shall be submitted on 8½" x 11" or 11" x 17" sheets (properly folded), in field books or on sheets provided to you by the instructor. Occasionally larger format output will be required
- Put your name, course number, assignment parameters and due date on the first page. **Staple multiple sheets together *prior* to turning in. (No name / no date / no staple = no score!!)**
- Any written reports, essays, or term papers shall be typed and formatted per instructions provided.
- Completed assignments are the student's responsibility. Failure to observe any of the above conditions may result in papers being returned without credit!

Required readings, handouts, weekly assignments and other information will generally be listed on the course calendar or on the white board at or near the beginning of each class meeting. The assignments will consist of a combination of worksheets, quizzes, mock exercises, discussion preparation, lab reports and written summaries.

Students should expect to complete a minimum of 1-2 hours of reading and/or homework for each class hour (e.g., 5 class hours per week translates into 5-10 outside hours per week; 10 class hours per week translates into 10-20 outside hours per week).

There will be no make-ups for missed assignments, labs or exams. Rarely, certain late submittals may be accepted but will be discounted starting at 20% off of total point value depending on how many classes have passed since the due date. Such instances will be at the instructor's discretion. After a certain date, no late submittals will be accepted. That date will be announced by your instructor during class, ~1 week in advance.

### **Essay Assignment Submittal and Format:**

All essay assignments are to be neatly word processed. *Electronic copies (Word and PDF) should accompany all hard copy assignments and deposited on the network M:\ drive in the SURV58 sub-folder bearing the student name as directed by your instructor.*

Laboratory assignments (reports / summaries and class projects) will be submitted in scientific manuscript format (Introduction, Materials & Methods, Results, Discussion and Conclusions). This includes any examinations that require a laboratory report or project report. Any essay type questions will follow the standard 5 paragraph essay format for writing style.

Links to examples of writing styles discussed above:

Scientific Writing Format:

<http://writing.colostate.edu/guides/processes/science/pop2a.cfm>

<http://abacus.bates.edu/~ganderso/biology/resources/writing/HTWgeneral.html>

Essay Writing Format:

<http://www.englishdiscourse.org/5.paragraph.essay.format.html>

[http://www.custom-essays.org/essay\\_types/Five\\_5\\_Paragraph\\_Essay.html](http://www.custom-essays.org/essay_types/Five_5_Paragraph_Essay.html)

### **Project and Field Exercises:**

- Attendance is mandatory. ***NO MAKE-UP LABS WILL BE GIVEN!***
- All projects and field exercises (labs) are to be completed as per instructions and are due at the assigned date and time.
- Labs will be held as described by your instructor or on any handouts. There may be field and/or office components associated with each lab. Frequently, there will be both.
- Your lab assignment will be due as indicated on the current course calendar unless otherwise stated by your instructor.
- Field books and computation sheets will be turned in together. Late assignments will not be accepted.
- Land Surveying and GIS mapping equipment is expensive and delicate. It is for the use of all CESGT students and therefore must be treated carefully and respectfully. You will be instructed in the proper handling and use of the equipment.

Similar to the professional land surveying and geospatial mapping work environment, student surveyors/mappers will be working in field teams. Field notes will be taken on every field exercise. Missions will be planned in advance. Some laboratory exercises will span multiple weeks before coming due. Similar to the professional workplace, your preparedness, attendance and team

effort are important to your success and that of your group members. GPS planning exercises and field exercises will be summarized in a professional scientific report format. The reports and data will be graded. Various examples will be made available during class to review in advance. They are NOT to be taken from the classroom -- ever!!! Students will rotate tasks within groups and sometimes rotate groups. Be prepared. Be professionals. You are being instructed and graded in that context.

At the discretion of the instructor, required field or classroom items or forms forgotten by the student may result in one or more of the following penalties; being excused from that lab or exam, grade points charged for the forgotten required item or form.

### Examinations:

Students will take a midterm and final exam worth **100-200 points each**. The midterm will be written. The final may be oral or written. The format for written exams is fill-in-the-blank, matching, short answer and essay, and may include a lab component. An oral final is generally a presentation of a student's mini-project or a core topic of study. Presentation details will be developed in class. Class examinations are mandatory. Please plan ahead.

- **NO MAKE-UP EXAMS WILL BE GIVEN!**
- The final exam is required. Failure to take this exam will result in a grade of **F** for the course.

### Scientific Calculators:

Students should have a scientific calculator and know how to use it (the range of recommended models will be discussed). For CESGT certificate students, your instructor strongly recommends the HP33s, the HP35s and the TI-30XIIs as these are calculators that will be allowed on certifying, licensure and board examinations. The instructor will NOT be responsible for training students in the use of scientific calculators.

Possession and working knowledge of a hand calculator is a REQUIREMENT for this class and will be necessary for all exams, quizzes and problem sets. Incorrect results secondary to miss-keyed or incorrectly used calculators are INCORRECT. In order to receive the most credit for work performed, please attempt, at all times, to SHOW YOUR WORK.

### Grading:

- Your grade will be based on the total number of weighted points you accumulate with respect to the total number of possible points. Homework, lab/assignments and exams are weighted accordingly and shown below:

Work Distribution	Point Weighting	Percentage	Grade
Homework & Labs	~40%	90 - 100%	A
Quizzes & Exams	~51%	80 - 89%	B
Student Participation	~9%	70 - 79%	C
		60 - 69%	D
		< 60%	F
<b>Total:</b>	<b>100%</b>		

- An incomplete grade "I" will only be given as prescribed by college rules and regulations. **Prior** approval of the instructor is required.

### STUDENT WEB READING (required):

It is the student's responsibility to consult the SRJC web-based information listed below -- please do so, they are considered parts of this syllabus:

SRJC Academic Schedules & Calendar to identify all important dates, deadlines and academic policies such as those relating to unexcused absences, adding and dropping classes. Students will follow all directions on exams and assignments sheets. When asked to work independently that means no *Also, please observe the emergency evacuation signs in each of the classrooms & computer labs.*

Schedule of Classes: <https://classes.santarosa.edu/>

Academic Calendar: <https://admissions.santarosa.edu/academic-calendar/>

SRJC Academics Information: <https://www.santarosa.edu/academics/>

SRJC Affairs and Programs: <https://studentlife.santarosa.edu/student-affairs-engagement-programs>

SRJC Disability Resources: <https://drd.santarosa.edu/home>

SRJC Rights and Responsibilities: <https://studentlife.santarosa.edu/rights-and-responsibilities>

*(Please take careful note of the link to Academic Integrity, cheating of any type will not be tolerated)*

### **Class Conduct & Courtesy:**

**During lectures:** Students should be listening to the lecture presentation; note taking is strongly encouraged. Students shall please refrain from having conversations, checking your email or web-browsing. These behaviors are distracting to others and to the instructor. **No student is allowed to print or plot without permission during any lecture under any circumstances.** This includes when you are visiting in an open lab or have received permission to work quietly when an instructor may be lecturing. Remember that you represent the CESGT Program especially when using the lab during other classes or during open lab hours.

The above distractions or any disruptive behavior during class **are grounds for being excused from class with a loss of that day's work.** Repeated events will result in disciplinary action via the Department Chair, Dean or Vice President of Academic Affairs.

Extended classroom or lab dialog of any kind may be deferred or terminated at the discretion of the instructor.

**During Laboratory:** Kindly remember that other students may have different study habits and priorities than you do. Please speak softly when conversing with other students. Avoid long and/or social (unrelated to class matters) dialog in the computer lab. Take such conversations outside.

### **During open lab times or when other classes are in progress.**

There will be open lab time in Kunde 111 and 151. A schedule will be posted on the doors to the labs. There may be lab seats available during other courses in progress. When desiring to occupy an empty station during a lecture, students should politely inquire with the instructor prior to just taking a seat. If a student shows up late and you are occupying their seat, you must vacate IMMEDIATELY. CESGT students will comport themselves per these course syllabus guidelines whenever using the computer labs. Again, you represent the CESGT Program to others.

**Cell Phones:** Turn cell phone ringtones off and if you must receive a call please **go outside** during your phone conversation.

***ABSOLUTELY NO FOOD OR OPEN DRINKS ALLOWED IN CLASS or COMPUTER LABS!!!***

**Passwords, Accounts and Access Codes:** Students will be given SRJC computer user accounts and will be required to establish user accounts at other websites. It is the responsibility of the student to keep track of their user names, passwords and security codes. Lost or forgotten passwords are not an acceptable reason for incomplete assignments.

### **Classroom Safety:**

Students are expected to follow all posted and published SRJC classroom safety and courtesy rules during class or when working during open or available lab times.

Please familiarize yourselves with the emergency evacuation diagrams and instructions on the walls of Kunde 111 and 151.

### **Computers, Equipment and Equipment Handling:**

In comparison to many other campuses, SRJC has high quality computer hardware, software and output facilities. In order to provide optimum laboratory access and usage experience; all students are expected to be familiar with and follow the posted rules for the computer labs (Kunde 111 and 151). **Any student observed violating the rules may be excused from class (first offense). Repeat offenses will result in a student being dropped from the class.** In some classes, your computer profile will NOT follow you to another station. During class times, students will be assigned a workstation/seat alphabetically by last name which will be their workstation for the entire semester. During class, students may not sit at another workstation without permission from the instructor. Students will be provided with computer access account numbers on the first day of class. All students will complete a laboratory compliance agreement during the first class meeting.

Students are to treat all course equipment with proper care. Any damaged or malfunctioning computer equipment shall be promptly reported to the instructor. Students observed or reported mistreating the equipment will be warned either openly or in conference; grade points may be deducted. Students who are repeatedly observed misusing equipment will be excused from that class. Students excused from class activities for mistreating equipment will not be allowed to make up that day's work. A second such event may result in a student being dropped from the course.

There are data volumes (folders) and documentation files for the various devices and software applications. This documentation can be found in the \PATHNAME\*\Library folder and the various subfolders on the student local and network drives. Any hard copy documentation and display articles are **NOT** to be taken off the lab premises or off campus for **ANY** reason without prior approval of the instructor. STUDENTS ARE NOT PERMITTED TO PRINT THE DOCUMENTATION FILES ON SRJC PRINTERS. When such documentation is required for an out of class assignment, it may be obtained from the \PATHNAME\*\Library folder in electronic format. Assignments and support information will be provided on the SRJC read-only (N:\) network drive and should be copied to the student's local drive (F:\) BEFORE opening or operating on the file or files. The majority of the support documentation is in PDF format. Students are expected to be familiar with the use of Adobe Acrobat Reader software. Please make certain that you allow yourself the necessary time to transfer the appropriate support documentation in advance of assignments and class exercises.

SURVEY 56 students will receive a presentation familiarizing them with the in-class computing, printing and plotting equipment as part of course content. Account passwords and authorization codes will be issued at that time. These presentations will not be repeated. SRJC provides laboratory supervision and limited software support during the open lab hours on the Santa Rosa



Campus. Please familiarize yourselves with Mr. Todd Amos' schedule. He is super knowledgeable and a valuable resource. His office is in Kunde 111 and 151.

\* PATHNAME=the SRJC network drive pathname to be established in class for the file location or locations.

### **KUNDE 111 and 151 Network Drives**

Drive C: Local hard drive in the computer  
Drive F: (Private drive unique to each person- copy class materials to this drive)  
Drive N: (Read-only to students. Full-access to faculty and staff. Copy class materials FROM this drive ASAP)  
Drive M: (Full-access to everyone) will be deleted periodically. Please don't leave your important files on this drive.

**NOTE:** Student USB drives or external HDDs should be inserted **AFTER** logon. External HDDs and USB drives should be used for backup and transfer of materials to outside/personal computers.

### **File Distribution:**

Certain course files for distribution will be available on the classroom network drive (N:\ drive) and on the SRJC File Depot (link below).

This semester, I will be using the **NEW** Google Drive-like **SRJC FILE DEPOT** to distribute large files over the internet and to receive large files and assignments. This will keep my SRJC mailbox from over filling with large attachments (assignments). Use of this site will be discussed at the first class meeting.

**Note:** instructor-posted files will remain on the N:\drive or File Depot site for ~ 2 weeks after posting and then be deleted. Be certain to download the files right away.

### **Survey and Mapping Equipment:**

Land surveying and geospatial mapping equipment is expensive and delicate. It is for the use of all CESGT students and therefore must be treated carefully and respectfully at all times. Students will receive a familiarization presentation for respective equipment as part of the regular curriculum (class/lab time). The demonstrations will include recommended equipment handling, equipment assembly equipment check-out, equipment check-in and safety methods. These presentations will not be repeated. All students will be expected to follow the SRJC course/instructor recommended protocols for equipment handling, storage and safety regardless of any training that they may be accustomed to following at an outside workplace. Students will work with the same equipment all semester. Equipment lockers will be assigned to facilitate this. Standard inventory check out/in sheets will be utilized (filled out) every lab and turned in to the instructor at the end of every lab. Lockers should be kept clean and neat and **free of food or trash**. Instructors will be randomly checking the lockers. Student teams found to not be returning equipment per class specifications **will be docked points**. Students should plan their field exercises to accommodate proper setup and equipment storage protocols.

Note: all battery operated CESGT surveying and mapping equipment should be carefully and correctly connected to an operating battery charger when not in use. This means that students **MAY** be expected to remove said devices from a charger/location at the beginning of an exercise



and return the device to that same charger/location at the end of an exercise. *Please check with your instructor before connecting or disconnecting these devices.*

All students are to treat the course equipment with proper care. Any damaged or malfunctioning equipment shall be promptly reported to the instructor. A "damage report form" (red card) should be neatly and legibly filled out by the student or student group that notes the issue on that same day. It should be attached to the piece of equipment and SHOWN to the instructor prior to leaving.

Students observed mistreating the equipment will be warned either openly or in conference. Students who are repeatedly observed mistreating equipment will be excused from that class. Students excused from class activities for mistreating equipment will not be allowed to make up that day's work. A second such event may result in a student being dropped from the course.

Each locker has hard copy documentation for most of the various devices. This documentation can also be found as a PDF in the \PATHNAME\*\Library folder on the student network drives. Hard copy documentation is **NOT** to be taken off the lab premises or off campus for **ANY** reason without prior approval of the instructor. STUDENTS ARE NOT PERMITTED TO PRINT THE DOCUMENTATION FILES ON SRJC PRINTERS. When such documentation is required for an out of class assignment, it may be provided from the ...\SURVEY56\Library folder in electronic format.

#### **Laboratory Field Exercises:**

While in the field for any reason, all students will wear safety vests (located in a plastic bin in the locker room). The vests should be neatly folded and placed back in their plastic bags when finished. Note the various sizes available.

Field labs are progressive in nature and class/lab time is at a premium. All scheduled labs will be held RAIN OR SHINE!!! As would be expected in an employment situation, students will be expected to anticipate weather conditions and dress in appropriate protective clothing for the field labs (layered upper clothing, long pants, boots, rain gear if necessary).

In some cases, plastic cones and barricades will be required at setups that are near street or foot traffic. Students will be instructed in their correct placement and use by the instructor. Safety equipment will be used for EVERY lab.

#### **Syllabus Purpose and Disclaimers:**

This syllabus is an agreement. Continued participation in this course means that you, the student, agree to the policies and procedures outlined in this document. If some aspect or aspects of the syllabus are unclear to a student, it is their responsibility to inquire regarding that matter at the outset of the course.

This syllabus is intended to provide guidance as to in what will be expected during the semester and will be followed as closely as possible. However, the instructor reserves the right to modify, supplement or make changes as necessary for general course needs as the semester progresses.

#### **Instructor Commentary:**

The 1-year program moves along quickly. Please do not fall behind. Come see me with problems EARLY, don't wait. The spring semester courses take the Fall semester concepts and apply them as you would in the professional workplace.

The bulk of land surveying and analysis is performed in your brain and subsequently implemented with technology. It cannot be emphasized how important it is to fully apply

yourselves at every lesson opportunity. The lectures, labs and examinations in these courses are not easy. They are designed to orient and prepare students for the qualification and licensure exams. Please make the absolute best use of your time. Thank you and WELCOME.

Respectfully,

Reg Parks  
SRJC E&AT CESGT Program