

SURV 60 – Introduction to Plane Surveying

COURSE SYLLABUS (ver.1b) - FALL 2021

[Secs.1305 & 1548](#)

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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](#)

Lect: TH 9:00 AM - 12:00 AM, ONLINE
Lab: TH 1:00 PM - 4:00 PM, Kunde 151
Lab: F 9:00 AM - 12:00 PM, Kunde 151
Office Hrs: TH 4:15-5:00 PM, Kunde 151
F 12:15-1:00 PM, Kunde 151
(except during monthly Friday Dept. Meetings)
or by apt. Analy Village, Bldg D, Rm 630,

WELCOME TO SURV 60 !!!

Lectures and Laboratory: This is a hybrid online/in-person course. Lectures will comprise approximately three (3) of the six (6) weekly course hours with the remainder devoted to field laboratory activities. The distribution may vary occasionally depending on student progress and specific class projects. Some portions of class time will be devoted to the use of computers and software applications, data management and problem solving process. Active synchronous Zoom attendance via laptop or desktop is mandatory. For additional online details, please see the *Fall 2021 COVID-19 ONLINE Course Syllabus Addendum*

Mandatory Final Exam Date: TENTATIVE -- Thursday, December 16, 7:00am – 9:45am.

NOTE TBA: One lecture & lab may be an independent research & problem solving exercise.

Required Textbook and Required Supplies: (available online and in SRJC Bookstore)

- *Elementary Surveying – An Introduction to Geomatics*, Wolf/Ghilani, Prentice Hall, 15th Ed.
- *SURV 60 Lab Syllabus*, a reference document, downloadable PDF from NEW SRJC file depot ~~or from CESGT N:\ drive~~. SRJC File Depot Link is **to be arranged (TBA)** --- links will be sent or a password assigned
- *Surveying field book*, hardbound only, NO spiral or loose leaf only two acceptable options:
Elan Standard Engineer's 64 - 4x4 spacing or
Sokkia #8152-60.4x4 spacing
- *HP 35s or HP 33s Programmable Scientific Calculator*. REQUIRED; these HP calculators are programmable and allowed under the [LS & CE state and federal licensing exam policy](#).
- *Surveying Solutions for the HP35s Calculator* by Ted Kerber, 4th Printing, 2010, Published by [Software by D'Zign](#), Tollhouse CA...Distributed by [CalculatorSource](#) and SRJC Bookstore
- Engineer's scale, mechanical pencil, eraser and straight edge. No ink allowed in field books!

Recommended Books and Recommended Supplies:

- Three-ringed binder for syllabus, class notes and assignments (note taking during lecture is strongly recommended)
- **TI-30X IIs** or TI36X Pro, additional inexpensive calculator to use while programming and learning the HP 35s or HP33s data entry logic.

SRJC Land Surveying Technology Certificate Program & Career Technical Education (CTE)

Students enrolled in the SRJC Land Surveying Technology 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. For more information, please consult the Program Coordinator (see links above).

This is a gateway course in a series of college courses that prepare the student for a career as a land surveying technician/professional. These courses are designed to develop entry or mid-level career

skills and are designed in conjunction with guidance from local professionals who assist in establishing course curriculum. Introductory courses are gateway courses intended to attract and motivate students to pursue a career track leading to a degree or certificate. SRJC recognizes its responsibilities to all CTE students and to the professional community into which they will graduate.

COVID-19 NOTICE: There will be a COVID-19 Field Lab addenda in the form of several supplementary documents and weekly protocol/waiver sheets to sign that are extrinsic to this syllabus. All will be covering student health and safety protocols. Upon receipt, please read them carefully. All guidelines must be scrupulously followed. Any deviation or failure to follow them will result in being excused from class. This land survey class functions as a workplace team. You are all responsible for the health and safety of your team members just as you would be in the workplace.

SURVEY 60 COURSE CONTENT:

Student Learning Outcomes:

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

1. Describe the concepts of Plane Surveying, including the Public Land Survey System
2. Properly set up and operate plane surveying equipment
3. Interpret and record data and field notes
4. Analyze and compute survey and engineering findings

Objectives:

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

1. Define the different types of land surveying and their uses.
2. Summarize the proper procedures and use of surveying equipment used in this course.
3. Prepare proper surveying notes and information.
4. Perform surveying computations involving angles, directions, distances, areas, volumes, and vertical and horizontal positions.
5. Calculate horizontal measurements by manual and electronic methods.
6. Determine the elevation difference between points using multiple survey leveling methods.
7. Lay out, measure, analyze and adjust level runs, field traverses and topographic side shots.
8. Compute direction of a line from field data and record data using magnetic and geodetic information.
9. Compute the relative position of points by traversing.
10. Calculate basic curve data and layout basic horizontal curves.
11. Prepare a simple topographic map from surveying data and information.

COURSE EXPECTATIONS:

SURVEY 60 is the prerequisite to and the first in a series of four land surveying courses. Together, they are designed to provide the fundamentals of basic land surveying concepts and field surveying methods. In Survey 60, we will explore the most basic of skills within the context of preparing students to become entry level land surveying professionals upon completion of the certificate requirements. 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 for each class session, to be prepared in advance for every class session and to remain for the entire time. It is strongly recommended that students write down any questions about the material while reading and studying and bring them to class for clarification.

Students are expected to have successfully completed high school math (Algebra, Geometry and Trigonometry or equivalent) ** with a grade of C or better. Students are expected to be familiar with microcomputer operations, the Microsoft (MS) Windows Operating System (OS). *MS Windows file management*, MS Windows File Explorer, MS Internet Explorer/Edge or Google Chrome, Adobe Acrobat Pro/Reader or Sumatra PDF (free downloads), Windows Notepad and MS Office (Word, Excel, PowerPoint). Tutorials are available on the SRJC campus and on You Tube.

Access to a computer and to the internet is key to passing this course. Please see the Fall 2021 COVID-19 ONLINE Course Syllabus Addendum.

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 sessions. Students are responsible for all material covered in lecture and lab as well as the readings and class assignments. Your lack of attendance will affect your grade for this course.
- It is good practice to notify your instructor **by email** if you are going to be tardy or absent. An excused absence may be granted by contacting instructor sufficiently **prior** to the beginning of class.
- Students are responsible for all material discussed 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.*** Taking notes is strongly recommended.
- ***Oh, and by the way, students are responsible for correctly obtaining any missed course announcements from their fellow classmates. and...taking notes is a really practice..***
- 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 (quizzes, exams, in-class demonstrations, etc). Rarely, certain late assignments 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 solely at the instructor's discretion.
- According to school policy, if a student misses over 10% of official course hours, they can be dropped from that course.

Assignments:

- Required readings, handouts, weekly assignments and other information will be listed at the end of the lecture slides and/or provided during class via Zoom or via links to the SRJC File Depot.
- All assignments are to be completed per the instructions provided and due at the beginning of class in a SRJC FILE Depot drop-off folder (link to be provided) on the assigned due date. The drop-off folder will be swept at the beginning of class.
- Unless otherwise directed by your instructor, all assignments shall be submitted in standard 8½" x 11" format as a PDF, in field books or on instructor provided worksheets.
- Students will include their name, course number, assignment parameters and due date on the first page. *(No name / no date = no score!!)*
- Any written reports, essays, or term papers shall be word processed, single spaced and formatted per instructions provided.
- Completed assignments per specifications are the student's responsibility. Failure to observe these conditions will result in papers being returned without credit!
- This is a CTE/CE course, if a student believes that the instructor has failed to provide instructions or some details regarding an assignment or procedure; **IT IS THE STUDENT'S RESPONSIBILITY TO INQUIRE IN SUFFICIENT TIME TO COMPLETE THE ASSIGNMENT...**just like one would in

any professional workplace.

- The average student should expect to complete a minimum of 1-2 hours of reading and/or homework for every hour of class (e.g., 3-6 hours per week for a 3 unit course).
- It is strongly recommended (again) that students write down any questions about the material while reading and studying and bring them to class for clarification.

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 (handouts) and are due at the assigned date and time. It is recommended that students prepare in advance, bring questions to lecture, and be prepared to hit the ground running.
- Labs will be held as specified by the instructor. There may be adjustments due to administrative issues. Those will be announced. There will be field and/or office components associated with each lab. Sometimes there will be both.
- Your completed lab field notes will be due all or in part, at the end of the lab unless otherwise specified by your instructor.
- Field books and computation sheets will be turned in together. Late field lab assignments will not be accepted.
- Traverse labs are designed such that EACH student is expected to SEQUENTIALLY and INDIVIDUALLY perform and close their own complete closed or open traverse. Teams observed taking parallel observations where several students observe one station and then move ahead repeating parallel observations and thusly completing only one loop overall, will be asked to box and bag their equipment and leave the field. The group members will receive no credit for that day's exercise.
- Field labs are 3 hours in length, it is strongly recommended that after efficiently gearing up, upon reaching and preparing the survey site (hubs, flagging, control mons) the remaining time be allocated equally among all group members to perform their individual traverse. Upon exhausting that time allocation, each student shall stop and yield the instrument to the next student WHETHER THEY HAVE COMPLETED THEIR TRAVERSE OR NOT.
- Land surveying equipment is expensive and delicate. It is for the use of all SRJC land surveying and engineering students and therefore must be treated respectfully. You will be instructed in the proper handling and use of the equipment. Students failing to follow procedure or seen mishandling the equipment will be given ONLY one (1) warning. A second observed occurrence will result in a student or students being excused from the lab with no opportunity to make it up. Repeat occurrences could result in a student or students being suspended or dropped from the course.

Examinations:

- ***TYPICALLY, NO MAKE-UP EXAMS WILL BE GIVEN!***
- *On rare occasion prior* instructor approval is necessary to reschedule an exam date.
- Exams will be given on specific areas covered throughout the semester. Sufficient notice will be given prior to the scheduled exam. Whenever possible, a brief review for an exam will be conducted or review materials provided.
- The final exam is required. Failure to take this exam will result in a grade of **F** for the course per SRJC policy..

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 requires the HP33s, the HP 35s backed up by either the TI-30XIIs or the TI36 Pro 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 or programming of scientific calculators. Some of this may be covered in APTECH 191 or in special on-campus programming clinics.

Possession **and** working knowledge of an HP33s or HP35s is a REQUIREMENT for this class and will be necessary for all examinations and quizzes. Incorrect results secondary to miss-keyed or incorrectly used calculators are INCORRECT

Grading:

VIP!!! In order to receive the most credit for all SURV 60 work performed, please attempt, at all times, to fully SHOW ALL YOUR WORK.

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

Work Distribution	Point Weighting	Percentage	Grade
Homework	~20%	90 - 100%	A
Quizzes & Exams	~40%	80 - 89%	B
Lab Exercises	~31%	70 - 79%	C
Student Participation	~09%	60 - 69%	D
		< 60%	F
Total:	100%		

- An incomplete grade "I" will only be given as prescribed by college rules and regulations.

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. *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>

Class Conduct & Courtesy:

During lectures: Students should be listening to the lectures and presentations. Students shall please refrain from having conversations, checking your email or web-browsing on either computers or smart phones. These behaviors are distracting to other students and to the instructor. **No student is allowed to print or plot when in Kunde 111 or 151 without permission.**

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.

During Open Laboratory / In-class Laboratory (in K151): There will be virtual open lab time with Mr. Todd Amos, SRJC Micro Computer Lab Specialist. While on campus actually or virtually, Survey 60

students will comport themselves per the course syllabus guidelines; field and laboratory. You represent the CESGT Program to others.

Kindly remember that other students may have different study habits and priorities than you do. Please speak softly when briefly conversing with other students. For remote access times, please use breakout rooms when meeting or conversing with other students.

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

Cell Phones: Please turn cell phone ringtones off. NO calls during class time.

***ABSOLUTELY NO FOOD OR EATING ALLOWED DURING CLASS or in K151 LAB!!!
and once again for the cheap seats.....also***

***ABSOLUTELY NO FOOD OR EATING ALLOWED DURING CLASS or in K151 LAB!!!
(nobody wants to see (or hear) you crunching potato chips or eating your chicken salad sandwich with your mouth open, licking your fingers, stuffing a burrito down your pie hole, or belching afterward thankyouverymuch)***

Passwords, Accounts and Access Codes: Students will be provided with SRJC 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 missed or incomplete assignments.

Computers, Equipment and Equipment Handling: (for SRJC loaner equipment)

All students are expected to treat any SRJC loaner equipment with proper care. Damaged or malfunctioning computer or equipment shall be promptly reported to the instructor and the loaning source. Students observed mistreating SRJC loaner equipment will receive a warning. Students who do so repeatedly will be suspended or dropped. All loaner equipment shall be returned per the policy and directions of the loaner source. Non-return of said equipment will result in severe penalties.

File Distribution:

All file exchange will be conducted via Zoom sessions or via the SRJC File Depot. Certain course files for distribution will be available on the SRJC File Depot (links to be provided) and will remain available for a limited time after posting before deletion. Be certain to download files right away.

Computers, Equipment and Equipment Handling:

SURVEY 60 students may be assigned computer accounts in Kunde 151. If so, they 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.

In comparison to many other campuses, SRJC has recently updated, excellent computer hardware, software and output facilities. In order to provide optimum laboratory access and usage experience; if applicable, all students are expected to be familiar with and follow the posted rules for the computer labs (Kunde 151). Any student observed violating the rules may be excused from class (first offense). Repeat offenses will result in a student being suspended or dropped from the class. In some classes your computer profile will NOT follow you to another station. Students will be assigned a workstation which will be their workstation for the entire semester. You 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.

All students are to treat the course equipment with proper care. Any damaged or malfunctioning computer or survey equipment shall be promptly reported to the instructor. Students observed mistreating the equipment will be warned either openly or in conference. 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 SRJC File Depot and if operational, student local and network drives. 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 60 students may 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.

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

JEFF KUNDE HALL KUNDE Computer Lab Network Drives (if operational during room access)

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 distributed 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.

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

File Distribution:

Course files for distribution will primarily be available on the SRJC File Depot ; and **OPTIONALLY ONLY IF OPERATIONAL**, on the classroom network drive (N:\ drive) use of the network will be discussed at the first class meeting.

Note: instructor-posted files will remain on the File Depot or network drive for ~ 2 weeks after posting and then may be deleted to conserve space. Be certain to download the files right away.

Syllabus Purpose and Disclaimers:

This syllabus is an agreement. Continued participation (past day 1) in SURV60 means that you, the student, tacitly 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 very quickly. The fall courses are introductory, gateway courses to the spring semester courses. The follow-on rigorous spring semester courses offer additional curriculum towards the Land Survey certificate / degree and build the foundation of all professional land surveying.

The bulk of land surveying is initially performed in your brain and subsequently implemented with technology as basic as a pencil and paper or as fancy as a calculator or computer. 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 workplace, qualification and licensure exams. They also reflect the serious professional obligations that newly licensed land surveyors will undertake for the state or states in which they practice. Please make the absolute best use of your time. Thank you and WELCOME.

Respectfully,

Reg Parks

SRJC E&AT CESGT Program

Please report any typos....thx, rp

COVID-19 FOOTNOTE: Beginning Spring 2020, and continuing through this Fall 2021 semester, CESGT courses have been modified in response to the ongoing COVID-19 health and safety restrictions and mandates. This will vary from the normal educational process that students are accustomed to. Much of the existing course has proven to be valuable to students before and after entering the industry workforce. With the addition of newer materials and methods, there will undoubtedly be some hiccups and improvements that can be made on the fly or integrated into next year's class. It is my desire as your instructor, to address these issues in the best possible way for the benefit of the entire class and CESGT Program. Thank you for your patience.

TENTATIVE BRIEF TOPIC OUTLINE for FALL 2020

(based on [Ghilani, 15th Edition, 2018](#))

The objective of this outline and the accompanying course calendar is to assist you in planning your schedule. Every effort will be made to stay on schedule. However, the instructor may find it necessary to make appropriate changes to meet the learning objectives for the entire class.

Students should be familiar with the weekly topic *prior* to the class lecture by reading the assigned chapter pages. **Please stay current in your reading.**

Instructor will assign homework problems for each topic listed below.

Section	Topic	Ch.	Description	Pages
1	1	1	Introduction	1-21
	2	2	Units, Significant Figures and Field Notes	22-43
	3	3	Theory of Errors in Observations	44-69
	4	6	Distance Measurement	129-163
2	5	4	Leveling – Theory, Methods and Equipment	70-100
		5	Leveling – Field Procedures and Computations	101-128
3	6	7	Angles, Azimuths and Bearings	164-184
	7	8	Total Station Instruments; Angle Observations	185-225
4	8	9	Traversing,	226-238
		10	Traverse Computations	239-269
5	9	11	Coordinate Geometry in Surveying Calc'ns (partial)	270-300
		12	Area	301-322
5	10	24	Horizontal Curves,	718-757
		25	Vertical Curves	758-776