

**SURV53 - Route Surveying & Design**  
**Course Syllabus - Spring 2024 Sec. 5520**  
 Lect: Friday 6:00-9:00 PM, **ONLINE - ZM**  
 Lab: Sat 8:30-11:30 AM, **IN-PERSON** Lindley 196

**Instructor: Neil King**  
 Office: TBA  
 Office Phone: TBA  
 Email: nking@santarosa.edu  
 Office Hrs: Fri. 5:00 to 5:50 PM  
 Or Sat. by appointment

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 Office Hrs: Fri., 8:30 to 11:30 AM / By Appt.  
 Office Hrs. Sat., 12:00A to 1:00P / By Appt.

**WELCOME TO SURV53 !!!**

**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:** A final exam for this course will be given on Friday, May 24th from 6:00 PM to 9:00 PM. (Note: an optional Saturday 5/26 morning exam time will be discussed)

<p><b>SURV53 - Required Course Text:</b>          1.) <u>Route Surveying and Design</u> 5<sup>th</sup> Edition; Meyer, Gibson; Harper &amp; Row Publishing, 1980 <b>(buy used, out of print)</b>          2.) <u>Surveying with Construction Applications</u> 7<sup>th</sup> or 8<sup>th</sup> Edition, Kavanagh, Prentice Hall, 2010, 2013 <b>(used and new, rent or buy)</b></p>	<p><b>SURV53 – Recommended / Reference Materials:</b>          1.) <u>SURV53 Lab Syllabus</u> available on the SRJC network drive or SRJC file depot          2.) SURV53 Library Folder (Work in Progress)          3.) SRJC Reserve Section in the Doyle</p>
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**Required Supplies:**

- Scientific-Engineering calculator:: HP 33s or HP 35s -- Software by D'Zign pre-programmed
- Personal Class II Safety Vest and 25' Steel Tape (from SURV60)
- Engineer's Scale, Mechanical Pencil, Eraser and straight edge for fieldwork
- Surveyor's 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

**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)

**SURV53 COURSE OUTLINE CONTENT**

**Student Learning Outcomes**

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

1. Describe the route location process
2. Properly set up and operate data collection equipment and software
3. Lay out civil engineering designs
4. Design photogrammetric and LiDAR control for use in topographic mapping
5. Perform complex computations used in civil engineering construction & route surveying projects.

**Objectives:**

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

1. Develop a route location for a transportation project.
2. Summarize the proper use of the total station and data collector software and hardware.
3. Perform a field survey for control, topographic and construction surveys.
4. Prepare maps, plats and drawings from field data.
5. Prepare a photogrammetric surveying layout.
6. Perform complex computations related to photogrammetric surveys, right of way acquisition surveys, roadway alignments, earthwork volumes, slope staking, and global positioning surveys.
7. Design and layout roadways using civil and surveying CAD software/hardware and surveying equipment.
8. Perform a field survey to slope stake a roadway.
9. Compute earthwork and other construction volumes.
10. Prepare route surveying documentation for different types of projects.

**COURSE EXPECTATIONS:**

SURV53 is designed to provide the fundamentals of route design and roadway/construction layout concepts and methods. The course emphasizes field data collection, related software applications and some field staking / layout activities. Additional attention will be given to control coordinate systems, post-collection data analysis, QA/QC, stationing and stake marking, and some advanced field methods. Online research, key-word searches and general web-browsing proficiency is required.

**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 arising from their SURV53 readings and assignments. Bring them to class for clarification.

Students are expected to have successfully completed SURV60, CEST51 and APTECH191 with a grade of C or better. They are expected to be familiar with microcomputer operations, Microsoft (MS) Windows and MS Windows file management, MS Windows Explorer, MS Internet Explorer, Adobe Acrobat Pro, MS Notepad and MS Excel spreadsheet software, Google Earth, AutoCAD, and Civil3D applications. Familiarity with ArcGIS Desktop is recommended. Tutorials are available on the SRJC campus. Please consult the campus website.

Access to a computer, word processor, spreadsheet application, PDF organizer/editor and a reliable internet connection of 5+ Mbps or better are key to passing this course. This is a lecture and field lab course held online and in a computer lab. Remote access to CESGT computer lab facilities will be expected to successful completing of assignments. Scheduled online open lab hours will be posted when available. Students must obtain a VM Ware class account requiring their student ID number from the instructor on the first day of class. The computer lab manager is Todd Amos, Micro Computer lab Specialist. He will issue notices to student regarding important Lindley Computer Lab issues during the semester. Please pay close attention to those emails as they are issued.

Please consult the SRJC Website, SRJC Academic Calendar and course handouts to identify, in advance, 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 students prepare for this program.***

### Attendance:

- Attendance is required for both lab and lecture hours. Lack of attendance can and will affect student grades for this course. Class generally begins on the hour and ends at ten (10) minutes before the hour.
- Roll will be taken. It is good practice to notify the instructor **by email** if one is 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, class readings or instructions via the internet (email) as well as the readings and assignments. Taking notes is a strongly recommended practice.
- **Students are responsible for correctly obtaining any missed lecture or laboratory course information from their fellow classmates.** *Please do not expect the instructor to provide concierge email services for absenteeism or failure to retrieve one's files from the network drives.*
- Student class participation is semi-quantitatively graded. It can and will affect final grades as will class conduct.
- There will be no make-ups for missed class activities (quizzes, exams, in-class demonstrations, labs, etc).
- Rarely, certain late assignments may be accepted but will be discounted starting at 20% off of the total point value depending on how many classes have passed since the due date. Such instances will be solely at the instructor's discretion. After a certain date, no late submittals will be accepted. That date will be announced by the instructor during class, ~1 week in advance.
- According to school policy, if a student misses over 10% of any course, they can be dropped from the course. In a 4-unit course, this is the equivalent of 1.75 lectures or lab meetings

### Assignments:

- According to the SRJC policy, 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., 4-8 hours per week for a 4 unit course).
- All assignments are to be completed per instructions and are due at the beginning of class on the assigned due date. A course calendar will be provided. It is the responsibility of the student to clarify any inconsistencies BEFORE submittal and with enough time to make any necessary changes.
- Course deliverables shall be submitted as follows:
  - on 8½" x 11" sheets (paper or PDF per spec) or on worksheets provided by the instructor. Unless otherwise directed, any maps and diagrams shall be submitted on 8½" x 11", 11" x 17" or 24" x 36" sheets (properly folded if hard copy) or on worksheets provided by the instructor,
  - *when* specified, assignments will be submitted as PDFs. They may be saved/exported from an application (ArcGIS, C3D, MS Word, etc.) or scanned to PDFs (NO PHOTOS). Multiple PDFs will be appended in page/logical assigned order and submitted as ONE SINGLE FILE to a specified online drop box area,
  - each file will have a prescribed filename that will be provided in each assignment's instructions. There will be no exceptions. *When an assignment originates from an MS Word file, both the .DOC AND the .PDF files are to be submitted. The same goes for .DWGs and their corresponding .PDFs,*
  - put your name, course number, assignment parameters (problem numbers, etc.), and due date on the first page (cover page) every assignment,
  - any written reports, essays, or term papers shall be word processed and formatted per instructions provided. No handwritten assignments will be accepted.

*Failure to observe any of the above conditions may result in papers being returned without credit!*

Completed assignments are the student's responsibility. Familiarize oneself with assignments early, If clarification is needed or an ambiguity is noted, contact the instructor early. Waiting until the night before the due date to inquire and not receiving a timely answer is on YOU!

Your instructor WILL NOT CONVERT third party software like Libre Office Apps, or Google Docs, Google Sheets, anything Google!!!

Required readings, handouts, weekly assignments and other information will generally be listed on the course calendar or on the assignment sheet. Assignments will consist of a combination of worksheets, quizzes, mock exercises, discussion preparation, lab reports and written summaries.

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

All essay assignments are to be neatly word processed. *Electronic copies (Word and PDF) should accompany any hard copy output from Lindley plotters, and shall be submitted per specifications or 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 additional 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 per instructor and lab handout specifications. 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 any 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. Students will be instructed in the proper handling and use of the equipment.

Similar to the professional land surveying and mapping work environment, students will work in field teams. Field notes will be taken on every field exercise. Most missions will be planned in advance. Some laboratory exercises will span multiple weeks before coming due. Your preparedness, attendance, and team effort are important to your success and that of your group members. TPS and GPS planning exercises and field exercises will be summarized in a professional scientific report format. The reports and data will be graded.

Various example documents will be made available during class to review in advance. They are NOT to be removed 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, safety, accessory items or administrative forms forgotten by the student may result in grade points deducted, the offending team being excused from that field lab/exam, or both.

**Quizzes and Exams:**

- Quizzes will be administered at the beginning of most class meetings on the previous week's topics discussed.
- Exams will be administered on specific areas covered throughout the course. Sufficient notice will be given prior to the scheduled exam with a review conducted the previous class lecture.
- Midterm and final exams are worth **~100-200 points each**. Midterms will be written. The format for written exams is fill-in-the-blank, matching, short answer and essay, and may include a lab component.
- Final exams are worth ~100-200 points and may be oral or written. 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!**
- Per SRJC policy, the final exam is mandatory. Failure to be present and take this exam will result in a grade of **F** for the course.

**Scientific Calculators:**

Civil and Survey students are required to 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-30XII as these are calculators that will be allowed on certifying, licensure and board examinations. Students are responsible for learning and performing the programming and operation of their calculators.

Possession and working knowledge of a hand calculator is a REQUIREMENT for all SURV classes 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	~51%	90 - 100%	A
Quizzes & Exams	~40%	80 - 89%	B
Student Participation	~09%	70 - 79%	C
		60 - 69%	D
		< 60%	F
<b>Total:</b>	<b>100%</b>		

- A grade of incomplete "I" will only be given with the prior approval of the instructor and per college 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. Students will follow all directions on exams and assignments sheets. When asked to work independently that means no interaction or exchange with others – no exceptions.

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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)*

### **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 Lindley 196 and 194.

### **Laboratory Field Safety:**

While in the field for any reason, students will wear and bring all assigned safety equipment.

Field labs are progressive in nature and class/lab time is at a premium. Unless otherwise advised by the instructor, 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 many cases, plastic cones and barricades will be required at equipment setups that are near street or foot traffic. Students will be instructed in their correct placement and use by the instructor. This safety equipment will be used for EVERY lab, be sure to bring them.

### **Course Conduct & Courtesy: (in-class or online attendance where applicable)**

**Passwords, Accounts and Access Codes:** Students will be allowed virtual and physical access to SRJC workstations in Lindley 196, and will be required to establish user accounts there, and 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

**During online course sessions:** Students should be on time, prepared, attentive, timely with all quiz and exam submittals and avoid disruptive behavior during lecture and laboratory sessions, **note taking is strongly encouraged.**

**During field laboratory:** Students should be attentive to laboratory instructional lectures, laboratory demonstrations, and exercise particular care with CESGT equipment both in the equipment room and in the field. Laboratory demonstrations will include CESGT required 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 these steps and techniques, regardless of any training that they may be accustomed to following at an outside workplace. Students will work with the same equipment all semester.

Students will work in field teams, out of the same equipment locker and use the same equipment for the duration of the semester. Lockers will be kept clean and free of dirt, debris, food and trash after EVERY lab session. Lockers will be inspected randomly and points will be docked for lockers or equipment out of compliance.

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 and attached to the piece of equipment and SHOWN to the instructor prior to leaving.

Each locker has hard copy documentation for most of the various devices. Hard copy documentation is **NOT** to be taken off the lab premises or off campus. When such documentation is required for an out of class assignment, it may be provided from the ...SURVEY53\Library folder in electronic format. STUDENTS ARE NOT PERMITTED TO PRINT THE DOCUMENTATION FILES ON SRJC PRINTERS

**During virtual Lindley 196 open lab sessions:**

The department will hold several ONLINE open lab sessions per week in the *virtual Lindley 196 computer lab*. They will be hosted by Mr. Todd Amos. He is familiar with many of the software programs and available for assistance with software methods – NOT course content or assignment questions. Todd is a valuable resource. A schedule of these sessions will be circulated when he makes one available. He is in-charge of the administration of these sessions at all times.

During these sessions, or at any other time you are online using virtual Lindley 196, if you are given an on-screen warning to shut down, please do so. Save your work and shut down PROMPTLY. This means another scheduled class needs that workstation and will begin shortly or scheduled maintenance will begin soon. **If you do not comply in a timely fashion, you run the risk of an abrupt automatic shut-down and loss of work.**

On-screen shutdown warnings are the student's responsibility to notice. Proper window management/desktop organization will help to avoid such events as data loss from a "surprise" shutdown due to not having seen the warning screen.

**Cell Phones:** Turn cell phone ringtones off and refrain from taking calls during class or open sessions. If you must receive a call, please mute your session and/or leave the room.

***ABSOLUTELY NO EATING IS ALLOWED ON-SCREEN OR IN LAB DURING CLASS SESSIONS. (nobody wants to see (or hear) you crunching potato/corn chips, eating your chicken salad sandwich with your mouth open, licking your fingers, stuffing a burrito down your pie hole, or belching afterward thankyouverymuch)***

**Password Accounts and Access Codes:** Students will be given SRJC computer user accounts and will be required to establish a user accounts at other websites such as ESRI. In some cases, authorization codes may be assigned to each student. 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.

**Computers, Equipment & Equipment Handling:** (online and in-person class sessions, some may not apply)

The Department of Engineering and Applied Technology CESGT Program updates and maintains excellent computer hardware, software, printing and plotting devices. In order to provide optimum laboratory access and usage experience; all students are expected to be familiar with and follow the posted and expressed rules for the computer labs (L196, L186). **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 moving between some classes (e.g. SURV to GIS to SURV), the same computer profile may NOT follow you to another station. Desktops may appear a bit different and privileges may differ slightly. Please take that into account. Students will be assigned specific, semester-long, physical workstations for in-person labs and assigned random workstations for online labs. Students may not sit at another physical workstation without permission from the instructor. All students will complete a laboratory compliance agreement during the first class meeting.

Students are to treat CESGT 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. **SURV53 students who have not taken SURV56 or SURV58 will not be considered certified or "checked out" on certain instructional equipment from those courses and will not be permitted to operate said equipment in SURV53 field exercises.**

Assignments and support information will be provided on the SRJC File Depot or course network drive and should be copied to the student's local drive 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 Pro software. Please make certain that you allow yourself the necessary time to transfer the appropriate support documentation in advance of assignments and class exercises.

SURV53 students will receive a presentation familiarizing them with the in-class computing, printing and plotting equipment, if necessary, 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.

\* PATHNAME=the SRJC network drive pathname to file location or locations.

**Lindley 196 and 186 Computer Lab Network Drives** (subject to change due to new VMware changes)

Drive C: Local hard drive in the computer  
Drive F: (TBA, 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 private or important files on this drive.  
Drive ?: **TBA**, under construction, this is a student submittal/grading drive, more later)

**FOLDER AND FILE NAMING IS IMPORTANT!!! no wait, CRITICAL!!!**

*The instructor will review file and folder naming conventions for this course. Students will maintain identical folder structures, pathnames and file names for their module assignments between network and USB and home drives. This will avoid the loss of internal software data linkages.*

**NOTE:** On physical workstations, 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:**

Certain course files for distribution may be available on the classroom network drive (N:\ drive) and on the SRJC File Depot (link below). Details to be discussed in class...

This semester, I will be using a combination of the Lindley 196 network drives AND the 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 over the first few class meetings.

**Note:** instructor-posted files will remain available for ~ 2 weeks after posting and then be deleted. Be certain to download the files right away.

**Syllabus Purpose and Disclaimers:**

This syllabus is an agreement. Continued enrollment (past day 1) in SURV53 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 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 spring semester courses offer additional curriculum towards the Land Survey certificate / degree and build the foundation of all professional land surveying. Please do not fall behind. Come see me with problems EARLY, don't wait.

The bulk of land surveying is initially performed in your mind and subsequently implemented with technology as simple 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 or inconsistencies)*