SURV 62
Introduction to Aerial Remote Sensing & Photogrammetry
COURSE SYLLABUS (ver.1a, 8/14/2024) - FALL 2024
Sec.1619

Primary Instructor: Neil King
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Lect: MW 6:00 AM - 7:00 PM, ONLINE
Lab: MW 7:00 PM - 8:30 PM, ONLINE
Office Hrs: MW 8:30:-9:00 PM+TBA ONLINE
or by appt.

Program and Instructor Web Pages:
Neil King SRJC Web Page
Jennifer Looper Web Page
Reg Parks Web Page

CESGT Program Web Page
Civil Engineering Certificate Web Page
Geospatial /GIS Certificate Web Page
Land Surveying Certificate Web Page

WELCOME TO SURV 62 !!!

Lectures and Laboratory: Introduction to Aerial Remote Sensing and Photogrammetry (ARSP) is a twice weekly, online course with two in-person demonstration labs. Lectures will comprise approximately three (2) of the five (5) weekly course hours with the remainder devoted to extended lecture and laboratory activities. The distribution of lecture and lab times and assignments 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 lecture attendance via laptop or desktop is mandatory. In-person lab attendance is mandatory. This course will NOT use Canvas.

Mandatory In-Class Final Exam Date: Monday, December 16, 6:00am – 9:00am.

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

Remote Sensing: Principles, Interpretation, and Applications, by Floyd F Sabins Jr and James Ellis, 4th Edition, 2020 (paperback and electronic copies available).

A student supplied safety vest (required), tape measure (recommended), and compass (recommended) will be useful in the field demos.

Recommended Books and Recommended Supplies:
- *Elementary Surveying – An Introduction to Geomatics*, Wolf/Ghilani, Prentice Hall, 16th Ed. 2022
- *GPS for Land Surveyors*, Jan Van Sickle,CRC Press, 5th Edition. 2023
- *Adjustment Computations: Spatial Data Analysis*, by Charles D. Ghilani, 6th Edition, 2017
- *Analysis and Adjustment of Survey Measurements,* by Mikhail, E,. and Gracie, G.,1981
- **TI-30X IIs** or TI36X Pro, additional inexpensive calculator to use while programming, validating, and learning the HP 35s or HP33s data entry logic.
- *Surveying Solutions for the HP35s Calculator* by Ted Kerber, 5th Printing, 12/2021, Published by Software by D'Zign, Tollhouse CA…Distributed by CalculatorSource and SRJC Bookstoore

SRJC CESGT Program & Career Technical Education (CTE)
The CESGT Program is a rigorous career education and training program leading to potential employment in one's respective professional discipline. Fall introductory courses develop fundamental office and field skills required for entry to spring courses.

SURV62 is:
a.) the first course in a discipline track, leading to an AS degree or certificate,
b.) the first in a two-course series for students who have completed the Civil and Surveying discipline tracks, leading to an AS or certificate,

and should be taken very seriously. These courses are designed to develop entry or mid-level career skills and are designed in conjunction with guidance each semester from regional professionals who collaborating in program and curriculum development. SRJC recognizes its responsibilities to all CTE students and to the professional community into which they will graduate.

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 student portal or “cubby” under "District Announcements" use the "Degree Audit Available" link. For more information, please consult the Program Coordinator (see links above).

SURVEY 62 COURSE CONTENT:

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Apply basic aerial remote sensing principles to aerial data management.
2. Plan aerial remote sensing flight paths and missions.
3. Prepare and implement aerial control networks.

Learning Objectives:
At the conclusion of this course, the student should be able to:
1. Define terms related to fundamental aerial remote sensing
2. Identify and describe the purpose of aerial remote sensing equipment
3. Capture and review data and develop aerial flight plans
4. Create basic aerial planning neat models
5. Select the correct coordinate reference system(s) for aerial project
6. Identify the differences between static, real-time kinematic (RTK) and real-time network (RTN) control networks
7. Identify the differences between Federal, State, local, and private Continuous GPS (CGPS) reference stations.
8. Develop and set aerial control networks

COURSE EXPECTATIONS:

SURVEY 62 is the prerequisite to SURV63. The course is designed to provide the fundamentals of aerial remote sensing and photogrammetry, related land surveying concepts, and data analysis/management methods associated with those disciplines. In this course, students will explore basic fundamentals within the context of preparing students for spring coursework. A serious student attitude is strongly encouraged and a team learning approach underpins the course culture. A team learning approach is one where along with the instructor, the student takes an equal (or better) measure of responsibility for their learning experience through their participation, performance and professional attitude.

The SURV62 course schedule is somewhat dynamic. Changes may occur. Some assignment and lab scheduling directives and changes will be given verbally in class. Please begin the semester by paying attention, asking questions early, taking notes, and being prepared for each class session.

Class Preparation:

Students are expected to arrive on time for each class session, to read as assigned, complete assignments on time, 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 at the beginning of lecture or lab.

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 comfortable with microcomputer operations, Microsoft (MS) Windows Operating System (OS). *MS Windows file management*, MS Windows File Explorer, web browsers (MS Internet Explorer/Edge, Google Chrome, or Firefox), Adobe Acrobat Pro/Reader or Sumatra PDF (free downloads), Windows Notepad and MS Office Suite (Word, Excel, PowerPoint). Tutorials are available on the SRJC campus and on You Tube.

Access to a computer and to a stable internet connection are key to passing this course. This includes a minimum 5 Mbps UPLOAD speed (when using the Virtual Lab), a functioning webcam that has both video and audio capabilities, and the ability to print and scan 8-1/2 x 11 inch sheets of paper (at the instructor's discretion, clear and legible digital photos may be an acceptable alternative to scanning)..

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:

- Attendance is required for both lab and lecture sessions. A lack of attendance will affect one's 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 covered in lecture and lab as well as course 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.
- Class participation can and will affect one's final grade as will one's 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 on a course planner, on instruction sheets, or provided as verbal instructions in class.
- All assignments are to be completed per the instructions provided and are generally due at the beginning of class in a SRJC FILE Depot drop-off folder (link to be provided). To ensure submittal timeliness, the drop-off folder will be swept at the beginning of class.
- Unless otherwise directed by your instructor, all assignments shall be submitted as a.) word-processed and submitted in standard 8½" x 11" MS Word format and as a PDF, b.) in MS Excel formatted spreadsheets per spec, or c.) 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 params = no score!!)***
- Written reports or term papers shall be word processed, single-spaced paragraphs, and formatted per instructions provided.
- Essay type exercises or questions will follow the standard five (5) paragraph essay or scientific writing format. Links to examples of writing styles provided below:

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

- Completed assignments per specifications are the student's responsibility. Failure to observe these specifications will result in papers being returned with lower scores or 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).
- Again, it is strongly recommended that students write down questions about the reading materials or homework and bring them to class for clarification. Questions will be invited for a brief period at the beginning of class.

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 provided (handouts)
- and are due at the assigned date and time. It is recommended that students prepare in advance, bring questions to lecture/lab, and be prepared to hit the ground running.
- Labs will be held as specified by the instructor. There may be adjustments due to weather or administrative issues. Those will be announced. There may be field 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.
- Assigned writings, lab exercises, worksheets and computation sheets will be turned in as specified either on handouts or verbally in class.. Late lab assignments will not be accepted.
- Field labs and field exercises are designed so that EACH student is expected to SEQUENTIALLY and INDIVIDUALLY perform and complete their own lab assignment.
- Labs are 1.5 hours in length. Field exercises are 3 hours in length. It is strongly recommended to be prepared for every lab.
- Land surveying, photogrammetry and LiDAR equipment is expensive and delicate. It is for the use of all SRJC land surveying and civil engineering students and therefore should be treated respectfully. Students will be instructed in the proper handling and use of the equipment. Please take notes. 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.

Course File Distribution/Exchange:
All online file exchange will be conducted via Zoom sessions and/or via the SRJC File Depot. Canvas may be used and its use will be discussed during the first week of instruction.

Certain course files for distribution will be available on the SRJC File Depot (links to be provided during class or on assignment sheets) and will remain available for a limited time (generally 2-weeks) after posting before deletion to conserve space. Be certain to download files right away.

Electronic Assignment Submittal and Format:
Assignment submittals will be uploaded, via provided links, to the SRJC File Depot per written assignment instructions or verbal instructions provided in class. Please pay attention.

Electronic assignments are due in PDF format in the SRJC File Depot folder at the beginning of class on the due date and time for that assignment. Written assignments are to be neatly word processed per spec. A FILENAMING HANDOUT or CONVENTION WILL BE ASSIGNED BY THE INSTRUCTOR. IT SHOULD BE FOLLOWED TO THE LETTER.

No handwritten assignments will be accepted. Exception -- textbook chapter problem sets may be submitted as ordered, LEGIBLE PDF scans (ONE PHONE SCANNED FILE, NOT PHOTOS) of NEATLY handwritten 8.5" x 11" sheets of ruled graph paper. They must also be numbered, with all work shown and with interim and final answers boxed for clarity. Ruled graph paper must be used for assignments that include graphing problems, where a graph or diagram is an answer.

Format, organization and legibility counts. If the instructor cannot follow, read or understand an assignment, it cannot be graded and will be returned with no score. Only assignments submitted on time will be given priority for timely grading returns.

Examinations:

- ***TYPICALLY, NO MAKE-UP EXAMS WILL BE GIVEN! – Firm!!***
- *On rare occasion **prior*** instructor approval may be necessary to reschedule an exam date.
- Exams will be given on specific topic 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 strong recommendation for this class and will afford time benefits for computations on examinations and quizzes. Incorrect results secondary to miss-keyed or incorrectly used calculators are INCORRECT. Again, in order to receive the most credit for work performed, please attempt, at all times, to clearly SHOW YOUR WORK.

Grading:

VIP!!! In order to receive the most credit for all SURV 62 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. ***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. *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/
SRJC Rights and Responsibilities: https://rightsresponsibilities.santarosa.edu/
(Please take careful note of the section on Academic Integrity, cheating of any type will not be tolerated)

Academic Integrity:

Per SRJC Policy 3.11; Academic dishonesty is regarded as any act of deception, benign or malicious in nature, in the completion of any academic exercise. Examples of academic dishonesty include cheating, plagiarism, impersonation, misrepresentation of idea or fact for the purposes of defrauding, use of unauthorized aids or devices, falsifying attendance records, violation of testing protocol, or inappropriate course assignment collaboration.

Class Conduct & Courtesy:

During lectures: Students should be listening to the lectures and presentations. Note taking is strongly encouraged. Per SRJC district policy, absolutely no recording of lectures is permitted without express permission of the instructor. 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 Lindley 196 or 186 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.

Open Laboratory (remote access or in-person) in L196: In addition to field lab times. there will be in-person and virtual open lab time supervised by Mr. Todd Amos, SRJC Micro Computer Lab Specialist. A schedule of hours will be provided. While on campus in-person or virtually, Survey 62

students will comport themselves per the course syllabus guidelines; field and laboratory rules. You represent the CESGT Program to others. When in doubt, please ask.

When using the computer labs, kindly remember that other students may have different study habits and priorities than you do. Please speak softly when briefly conversing with other students. Take phone calls outside the room. For remote access open labs, please use breakout rooms when meeting or conversing with other students.

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

ABSOLUTELY NO FOOD, DRINKS, OR EATING ALLOWED DURING CLASS or in L196 LAB!!!
(sealed water bottles may be kept under your desk)
and once again for the cheap seats.....
ABSOLUTELY NO FOOD, DRINKS, OR EATING ALLOWED DURING CLASS or in L196 LAB!!!
(sealed water bottles may be kept under your desk)

Passwords, Accounts and Access Codes: In certain CESGT courses, students will be provided with SRJC workstation user accounts and will be required to establish user accounts at other websites as well. 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.

Computer Labs. Computers, Equipment and Equipment Handling: (for CESGT equipment)
SURVEY 62 students may be assigned computer accounts in Lindley 196. If so, they 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.

In comparison to many other campuses, SRJC has a brand new building and recently updated, cutting edge 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 (Lindley 196, 186). 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 personal computer profile will NOT follow you to another class or classroom. Students will be assigned a workstation which will be their workstation for the entire semester. You may not sit at another workstation during class without permission from the instructor. Students will be provided with computer access account numbers on the first day of class or lab.

All students are expected to treat any SRJC classroom and laboratory equipment with proper care. Damaged or malfunctioning equipment shall be promptly reported to the instructor by the operator. Students observed mistreating any CESGT lab equipment will receive a warning. Students excused from class activities for mistreating equipment will not be allowed to make up that day's work.
Repeat offenders 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 legal and academic penalties.

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.

Lindley STEM Center Computer Lab Network Drives (if operational during room access)

Drive C:	Local hard drive in the computer
Drive F or ?:	(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.
Drive ?:	(**TBA**, letter varies per class, this is a student submittal/grading drive, more later…)

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

Network File Distribution:

As previously discussed above, course file exchanges will primarily be conducted via the SRJC File Depot. Occasionally and optionally some file may be distributed via the classroom network drive (N:\ drive) when appropriate. Use of the network requires a student account and will be discussed at the first class meeting.

Syllabus Purpose and Disclaimers:

This syllabus constitutes an agreement. Continued participation (past day 1) in SURV62 means that you, the student, tacitly agree to the policies and procedures outlined in this document and any verbal course directives provided in class. If some aspect or aspects of the syllabus are unclear to a student, it is their responsibility to inquire regarding that matter before the second class meeting.

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

The CESGT workplace is evolving, Technology is evolving. Certification and licensure exams are evolving with them. The CESGT Program is in its 58th year. These programs and courses have proven to be valuable to students before and after entering the industry workforce and when taking examinations. With initial course offerings and with the updating and 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 cooperation and patience.

Instructor Commentary:

The stackable CESGT 1-year programs move 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 and sequenced to orient and prepare students for the workplace, certification and licensure exams. They also reflect the serious professional obligations that newly certificated technicians and licensed professionals 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,

Neil King, Jennifer Looper, Reg Parks

SRJC E&AT CESGT Program

Please report any typos, broken links or inconsistencies….thx, rp