APTECH 191 - INTRO to GEOSPATIAL PROBLEM SOLVING & QUANTITATIVE REASONING

COURSE SYLLABUS (ver.1a, 7/13/2024) - FALL 2024, Sec. 2912

Instructor: Reg Parks
Office: Lindley STEM Center, 2nd Floor, Room.238
Office Phone: (707) 527-4376
Cell Phone: (707) 246-6960
Email: rparks@santarosa.edu
Lect: M, 2:00 - 5:00 PM, ONLINE
Office Hr: M, 5:00 – 6;00 PM, ONLINE
or by appt.

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

WELCOME TO APTECH 191!!!

Lectures and Classwork: Mondays from 2:00 PM to 5:00 PM ONLINE via active synchronous Zoom sessions. Lectures are typically held in the CESGT computer labs. Some portions of class time will be devoted to the use of computers and software applications in the problem solving process. Active Zoom attendance via laptop or desktop is mandatory. This class will NOT use Canvas.

Final Exam Date: Students should plan on being present for a mandatory final exam currently scheduled on: Monday, December 16th, 1:00pm – 3:45pm. (subject to change)

APTECH 191 Required Course Materials:	**APTECH 191 Recommended Materials:**
1.) Elementary Technical Mathematics, Ewen, Cengage Learning, 12th Edition, 2019 2.) Hand calculators (HP vs. TI and HP programming guide based on certificate or AS degree track -- (see below)	1.) APTECH 191 Library Folder: articles, handouts, white papers, user guides and manuals (always under construction) 2.) Mastering Technical Mathematics, Gibilisco, MGCI Press, 3rd Edition, 2008, ISBN-13: 978-0071494489 (Doyle Reserve)

SRJC Civil Engineering, Surveying and Geospatial Technology (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.

APTECH 191 is an introductory course in a series of college courses that build basic computational and quantitative reasoning skills for students preparing for an entry or mid-level technical professional career. 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 CESGT 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).

APTECH 191 COURSE CONTENT:

Student Learning Outcomes:

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

1. Define and solve algebraic, geometric and trigonometric problems in the fields of civil engineering, land surveying, geospatial and construction technologies.
2. Describe and evaluate measurement data using descriptive statistics and exploratory data analysis.

Objectives:

1. Solve problems involving triangles, polygons, curves and curve elements, terrestrial baselines (vectors), Global Positioning System, GPS signal vectors, matrices and measurement data.
2. Calculate curve elements, arc lengths and areas of sectors and segments.
3. Analyze and solve problems relating to the dimensions of geometric solids such as earth volumes, cut and fill, tailings, concrete forms.
4. Solve linear equations and inequalities with more than one variable such as those found in trilateration methods of GPS ranging.
5. Solve systems of equations through the use of graphing, addition, substitution and comparison.
6. Evaluate and solve ratio and proportion problems found in the civil engineering, land surveying, geospatial and construction fields.
7. Evaluate and summarize measurement data using descriptive statistics and exploratory data analysis methods.

COURSE EXPECTATIONS: general and specific

APTECH191 emphasizes concepts and methods for geospatial problem solving and quantitative reasoning. Along with coverage of basic mathematical concepts, approaches to solving practical and relevant industry problems will be discussed. These skills will be further utilized in subsequent technology based courses within the four CESGT certificate/degree disciplines. 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.

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. This course runs 17.5 wks x 3 hrs/week = 52.5 hrs

- 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" format as a PDF, b.) in legibly hand-lettered and diagrammed field books 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.

Quizzes & Exams: Over the course of the semester, students may be given one (1) to four (4) unannounced quizzes, usually administered at the beginning of class, timed and submitted to the SRJC File Depot drop-off folder. Similar to licensing exams taken in testing centers, these files are required to be in the folder within 30 seconds of the instructor calling time. Students may be given one (1) to three (3) midterms and one final exam**.** The format for the quizzes and exams is straight calculations, word problems, matching, short answer and short essay. Class examinations are mandatory as scheduled. There will be no make-up exams or quizzes. Please note: a phone message or text sent a few minutes before class stating that you cannot be present, while helpful, does NOT constitute a potential prior arrangement or excused absence. Please plan ahead.

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.

A FILENAMING HANDOUT or CONVENTION WILL BE ASSIGNED BY THE INSTRUCTOR. IT SHOULD BE FOLLOWED TO THE LETTER.

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.

Scientific Calculators: (also refer to class handout titled *APTECH191_Tools_Accessories*)
Students should have a scientific calculator and know how to use it (the range of required/recommended models will be discussed). For CESGT certificate students, some instructors require either the HP33s or 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 the various scientific calculators. Surveying students will be REQUIRED to purchase and use the HP35s and to purchase the Kerber programming manual. Civil Tech students should give strong consideration to these calculators.

Possession **and** working knowledge of a hand calculator 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. Again, in order to receive the most credit for work performed, please attempt, at all times, to clearly SHOW YOUR WORK.

Tip: The Ti-30XIIs is roughly $11-14. It is a good way to check yourself while learning the HP35s which sells on Amazon, CalculatorSource, EBay and other sites – it is recommended to buy both.

Grading Policy:
VIP!!! In order to receive the most credit for all APTECH191 work performed, please attempt, at all times, to fully EXPLAIN or 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		~60%	90 - 100%	A
Quizzes, Exams, Essays		~31%	80 - 89%	B
Student Participation		~05%	70 - 79%	C
Subjective		~04%	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.

During Open Laboratory / In-class Laboratory (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. While on campus in-person or virtually, APTECH191 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.

Cell Phones: Turn cell phone ringtones off and if you must receive an emergency call please mute your microphone.

ABSOLUTELY NO FOOD OR EATING ALLOWED DURING CLASS!!!
and once again for the cheap seats.....
ABSOLUTELY NO FOOD OR EATING ALLOWED DURING CLASS!!!

Passwords, Accounts and Access Codes: Students may 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.

Computer Labs. Computers, Equipment and Equipment Handling: (for CESGT equipment) APTECH191 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 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. 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.

All CESGT students are to treat the SRJC classroom computer equipment with proper care. Any damaged or malfunctioning computer equipment shall be promptly reported by the operator to the instructor by the operator. Students observed mistreating any computer equipment will receive a warning. Repeat offenders will be suspended or dropped. Students excused from class activities for mistreating equipment will not be allowed to make up that day's work.

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.

APTECH191 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:	(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 APTECH191 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 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 CESGT certificate / degree and build the foundation of all professional career development.

The bulk of civil engineering and land surveying mathematics and problem solving is initially performed mentally in the setup/solving process and subsequently implemented with technology as simple as a pencil and paper or as fancy as a calculator or a 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,

Reg Parks

SRJC E&AT CESGT Program

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

HAND CALCULATORS:

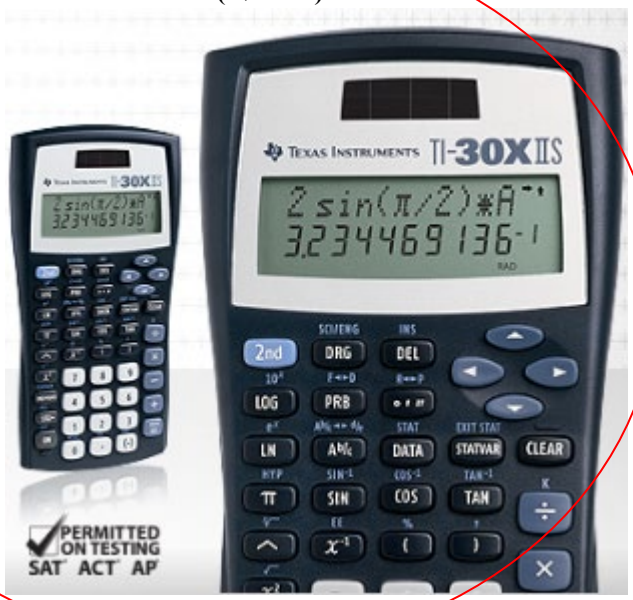
All CESGT students are required to have a hand calculator. Two makes and four models constitute the required choices for Civil and Survey Tech students. *Federal and state and civil engineering licensure exams restrict calculator use to these and a two other Casio models.* Only the two HP models are programmable. Please refer to your syllabus for additional information.

Survey 60 students are required to purchase the HP calculator and programming manual circled below. Civil students are STRONGLY recommended to have the HP33s or **HP35s** programmable calculators. Both HPs will hold hand entered programs (see below) for faster execution of survey and engineering exam problems for your in-class AND your state licensing exams. ***GIS-only certificate only students may elect to purchase one of the two TI models.***

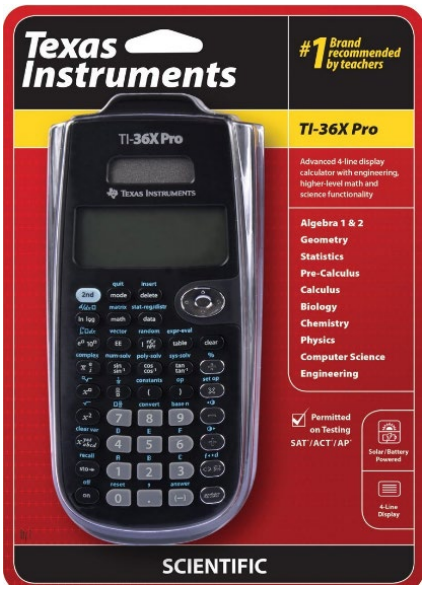
HP 33s (scarce, no longer in production)

HP 35s (preferred, still available pricing varies)

TI-30X IIS (~$11-12)



TI-36X Pro (~$17-18)



Software by D'Zign HP 33s Programming Manual
Surveying Solutions for the hp33s

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https://www.calculatorsource.com/dz-33s-survey.html

Software by D'Zign HP 35s Programming Manual

https://www.calculatorsource.com/dz-35s-survey.html

Ted Kerber Programming Manuals -- pricing varies, be diligent in your searches.

NOTE: SURV60 students are REQUIRED to purchase an HP35s or HP33s AND the corresponding above circled Kerber Programming Manual. Civil Tech and Civil Engineering transfer students are STRONGLY RECOMMENDED to purchase the HP35s AND the Ted Kerber Programming Manual. Please refer to NCEES Exam Calculator Policy

That said, the State Boards and NCEES have NOT disallowed the older discontinued HP33s and the recently discontinued HP35s (preferred) for NCEES and state-specific exams in Civil Engineering and Land Surveying. They remain the ONLY PROGRAMMABLE CALCULATORS on the approved list. *For this reason, the CESGT Program will continue to require the HP35s (or the HP33s if you can find one) for land surveying classes.* ~~The SRJC Bookstore sells the Ted Kerber D'Zign Surveying Solutions manuals for the HP35s only.~~

I continue to be aware of the hike in the price of the HP calculators. Evidently, in 2022, HP restructured and sold off its calculator division to the Royal Company. Unfortunately, they are STILL gearing up to manufacture the HP35s. Therefore, the HP35s calculators remain scarce & somewhat expensive.

HERE ARE SOME SITES THAT WERE SELLING THE HP33s and HP35s:
Amazon Prime: sellers offer the HP35s calculator

CalculatorSource: sells the HP33s and HP35s calculators. They also sell the HP35s and HP33s Ted Kerber D'Zign Surveying Solutions guides.

CAUTION!! There are other programming booklets but the CESGT Program only supports the Ted Kerber programming for the HP33s or 35s calculators. We believe it to be superior.

AceDepot: sells the HP33s but be sure to locate the Ted Kerber HP33s programming manual for that specific calculator BEFORE you purchase.

Various EBay sites are selling the HP35s new or used. *Students are encouraged to search for other sites and find their own best calculator deals…..*