APTECH 191 - INTRO to GEOSPATIAL PROBLEM SOLVING & QUANTITATIVE REASONING

COURSE SYLLABUS (v1a) - FALL 2022,
Sec. 2912

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Lect: M, 2:00 - 5:00 PM, ONLINE
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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

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. ~~For additional online details, please see the Fall 2021 COVID-19 ONLINE Course Syllabus Addendum.~~

Final Exam Date: Students should plan on being present for a mandatory final exam currently scheduled on: Monday, December 12th, 1:00pm – 3:45pm. (subject to change)

APTECH 191 Required Course Materials:	**APTECH 191 Course Reference Materials:**
1.) Elementary Technical Mathematics, Ewen, Cengage Learning, 12th Edition, 2019 2.) Hand calculators (HP vs. TI and HP programming guide -- (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)
Students enrolled in the SRJC CESGT Technology Program must complete all coursework with a grade of C or higher to qualify for a degree or certificate. For more information, please consult the Program Coordinator (see links above).

APTECH 191 is an introductory course in a series of college courses that build some basic computational and quantitative reasoning skills for students preparing for an entry or mid-level technical professional career. These courses are designed in conjunction with guidance from local professionals who assist in establishing course curriculum. Introductory courses are also gateway courses leading to a degree or certificate. SRJC recognizes its responsibilities to all CTE students and to the professional community into which they will graduate.

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:

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 three 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 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 class, to be prepared in advance for every class and to remain for the entire session. 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 comfortable with microcomputer operations, Microsoft (MS) Windows 10 Operating System (OS) and MS Windows file management, MS Windows Explorer, MS Internet Explorer/Edge or Google Chrome, Adobe Acrobat Pro / Reader or Sumatra PDF (free downloads), MS Notepad and MS Office software suite. Tutorials are available online and 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 all 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. Your lack of attendance can affect your grade for this course. Class generally begins on the hour and ends ten (10) minutes before the hour.
- 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 class 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 a good practice.
- ***Oh, and by the way, students are responsible for correctly obtaining any missed course announcements from their fellow classmates..and…taking notes is a good 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 based on how many classes have passed since the due date. Such instances will be solely at the instructor's discretion (see below).
- According to school policy, if a student misses over 10% of any course, they can be automatically dropped from the course. This course has 17.5 wks x 3 hrs/week = 52.5 hrs

Assignments and Examinations:

- 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. The assignments will consist of a combination of chapter problems, worksheets, mock exercises and written summaries.
- All assignments are to be completed per given instructions 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 folder will be swept at the beginning of class. On very rare occasion, late assignments will be accepted with instructor's ***prior*** approval. A substantial penalty (determined by the instructor) will be deducted from the grade. After a certain point in the semester NO late assignments will be accepted - that date will be announced in class.
- All assignments shall be submitted in standard 8½" x 11" format as a PDF. Photos taken of class assignments will not be accepted. A separate handout named "*APT191_2020_S&S_Instructions.PDF*" will detail homework submittal and scoring details.
- Students will include their name, course number, assignment parameters (problem numbers, etc.) and due date on the top of first page. *(No name / no date / no params = no score!!!)*
- Any written reports, essays, or term papers shall be typed and formatted per instructions provided by your instructor.
- 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 you believe that your 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 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.

Quizzes & Exams: Over the course of the semester, students will 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 left 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.

Assignment Submittal and Format:
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. All assignments are to be neatly word processed. A FILENAMING CONVENTION WILL BE ASSIGNED IN CLASS 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 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 as an answer. If the instructor cannot read an assignment, it will not be graded and returned with no score. Only assignments submitted on time will be given priority for timely grading returns.

Any essay type exercises or questions will follow the standard five (5) paragraph essay format for writing style. Links to examples of writing styles discussed above:

Scientific Writing Format:
http://writing.colostate.edu/guides/processes/science/pop2a.cfm
http://abacus.bates.edu/~ganderso/biology/resources/writing/HTWgeneral.html

Essay Writing Format:
http://www.englishdiscourse.org/5.paragraph.essay.format.html
http://www.custom-essays.org/essay_types/Five_5_Paragraph_Essay.html

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, your instructor strongly recommends the HP33s, the **HP 35s** and the **TI-30XIIs** as these are calculators that will be allowed on certifying, licensure and board examinations. The instructor will NOT be responsible for training students in the use or programming of scientific calculators. Survey 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. In order to receive the most credit for work performed, please attempt, at all times, to 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 for roughly $130-165 at collaborating EBay sites – it is recommended to buy both.

Grading Policy:

- Student grades will be based on the total number of weighted points accumulated with respect to the total number of possible weighted points.

Work Distribution		Point Weighting	Percentage	Grade
Homework		~60%	90 - 100%	A
Quizzes & Exams		~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. *Also, please observe the emergency evacuation signs in each of the classrooms & computer labs (in-class courses only).*

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 presentation or participating in class discussions. (In-class or online) Students shall please refrain from having outside conversations, checking your email, gaming or web-browsing. Such behaviors can be distracting to others and to the instructor.

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 laboratory sessions: Kindly remember that other students may have different study habits and priorities than you do. Use breakout rooms when meeting or conversing with other students.

Other: If students are participating in any on-campus activity or assigned out of class activity, they will comport themselves per the course syllabus guidelines. You represent the CESGT Program to others. When in doubt….ask!

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

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

ABSOLUTELY NO FOOD OR EATING ALLOWED DURING CLASS!!!
(nobody wants to see (or hear) you crunching on chips, 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 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.

Computers, Equipment and Equipment Handling: (for SRJC loaner equipment)
All students are expected to treat any in-class or 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 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.

Syllabus Purpose and Disclaimers:
This syllabus is an agreement. Continued participation (past day 1) in APTECH 191 means that you, the student, agree to the policies and procedures outlined in this document and discussed in class. 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 what will be followed as closely as possible. However, the instructor reserves the right to modify, supplement or make changes as necessary for general course needs as the semester progresses.

Instructor Commentary:
The 1-year program moves along quickly. Most of the CESGT Fall courses are introductory, gateway courses to the spring semester courses. Follow-on courses advance students toward a CESGT certificate/degree & build a foundation for related professional technical employment.

The bulk of 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. In a one-year certificate program courses move along rapidly. It cannot be emphasized how important it is to fully apply yourselves at every lesson opportunity. The lectures, activities and examinations in these various courses are not easy. They are designed to orient and prepare students for employment qualifications and the various licensure exams. They also reflect the serious professional obligations that newly certificated or licensed technical 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

FOOTNOTE: Beginning Spring 2020, and continuing through this Fall 2022 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.

HAND CALCULATORS:

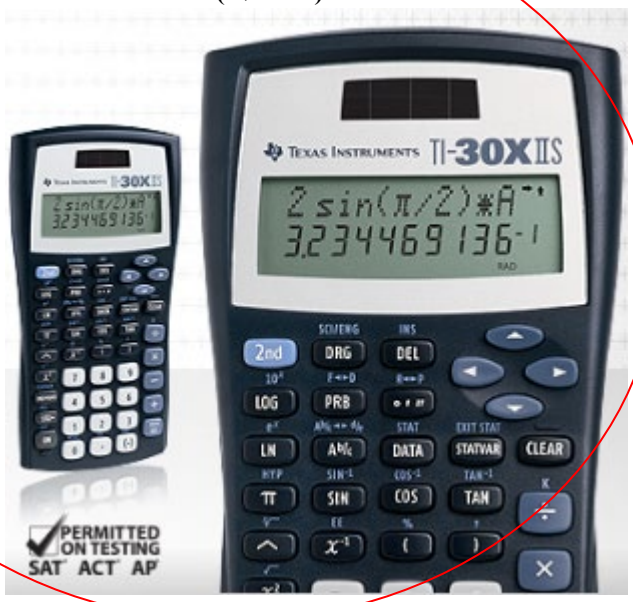
All CESGT students are required to have a hand calculator. Two makes and four models constitute the required choices for Civil and Survey Tech students. *All US survey and civil engineering licensure exams restrict calculator use to these and a two other Casio models.* Only the two HP models are programmable. 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.***

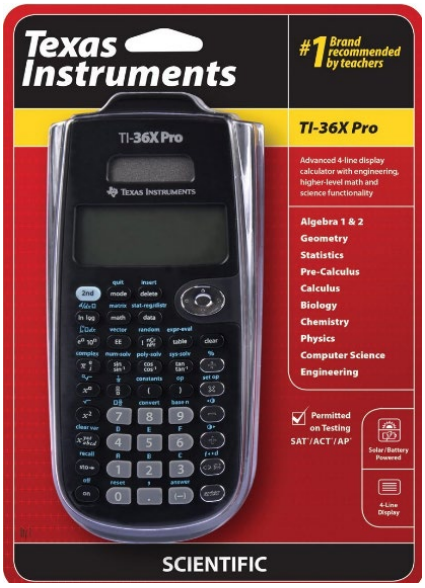
HP 33s (scarce, no longer in production)

HP 35s (preferred, still available pricing varies)

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

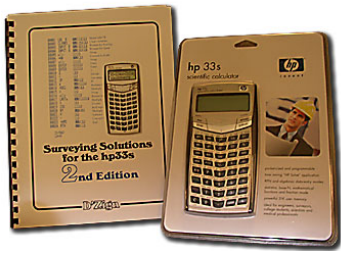


TI-36X Pro (~$17-18)



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: Again, SURV60 students are REQUIRED to purchase an HP35s AND the above circled Kerber Programming Manual. Civil Tech and Civil Engineering students are STRONGLY RECOMMENDED to purchase the HP35s AND the Ted Kerber Programming Manual. GIS students may us any calculator.

Please refer to NCEES Exam Calculator Policy

FALL 2022 NOTE!! **In early 2022, Hewlett Packard restructured and outsourced its calculator division to two other companies (Royani and Morovia). For now, these two companies have discontinued the HP35s. Pricing on the remaining calculators in the marketplace will fluctuate and probably go up.**

That said, the State Boards and NCEES have NOT discontinued approving 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.

HERE ARE SOME SITES THAT (as of 8/9/2022) WERE SELLING THE HP33s and HP35s:
Amazon Prime: sellers offer the HP35s calculator (marked up to $199.00)
CalculatorSource: sells the calculators (marked up to $199.95). They also sell the HP35s and HP33s Ted Kerber D'Zign Surveying Solutions guides for $64.95 and $124.95 respectively.
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 for around $80 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. One EBAY site run by "gradechecker" has recently agreed to reduce their price (new in packaging) from $165 to $135 if you use the password "CESGT STUDENT" all caps.

Students are encouraged to search for other sites and find their own best calculator deals…..