Sierra College MECH-01
Jim Weir 530.272.2203
jweir@sierracollege.edu
www.rstengineering.com/sierra

CLASS OUTLINE & SYLLABUS
ROCKLIN CAMPUS Room V-108
FALL SEMESTER 2018
Mechatronics 01 (MECH-1)

Curriculum: A broad overview of electronics technology presented in the context of elementary physical, chemical, and mathematical analysis. Applications of practical knowledge of basic topics including semiconductors, microprocessors, electronic music, robotics, and electric vehicles. Scientific, historical, political, and economic connections to electronics will be explored.

OPTIONAL Text: Gibilsco, Stan. "*Teach Yourself Electricity & Electronics*", **4th Edition**. ISBN 0-07-145933-2. **Please note that in this class, the text is optional. There is nothing on any exam, lesson, or other assignment that is not on my website www.rstengineering.com/sierra .**

Materials: Each student will need a notebook or binder with paper and pencils or pens. A 3-ring binder for compiling class handouts and materials is optional but suggested.

- Eye Safety: Personal protective eye wear conforming to ANSI - Z87.1 must be worn by every student in the classroom any time there is a potential hazard that could adversely affect a person's eyes and/or face (Examples: cutting, drilling, shearing, or other metalwork; cutting or clipping wires or component leads; etc.). You must furnish your own eye protection which can be purchased at an automotive parts retailer, hardware store, or from the Mechatronics Robotics Club at a nominal cost. You are required to bring and use your protective eye wear during every project session.

- Computer Memory: **If you do any work on the computer in the classroom, anything you do will be wiped clean when the computer is turned off.** I recommend a flash drive (thumb drive, memory stick, etc.) for taking work off the computer before leaving class.

- Calculator: A calculator with the ENG function. Not the "ε" or "e" but **ENG**. I suggest the simplest scientific calculator possible as the complicated ones are difficult to use. Casio and TI both make excellent calculators under $10 at the "Wallymarket" type stores.

- I strongly suggest the purchase of an inexpensive multimeter. There are several available on the market. The least expensive ($6) is available from Harbor Freight (and sometimes a free coupon). It will be useful whether or not you continue your studies in Mechatronics.

Add/Drop: All persons attending class must be officially enrolled in the class. **I do not drop students automatically for not attending class; students not attending and not dropping officially will receive a grade of "F"**.

Programs: "MECH" stands for "Mechatronics". Computer control of mechanical devices (motors, magnets, etc.) is fundamental to the Mechatronics process, but in this class we will also use the computer for such things as web page based documentation of the class, word processing for papers, and spreadsheets.

- The first program is a word processing program from Microsoft called "**Word**". Word is the standard by which all word processing programs are measured. Word is Sierra College's standard word processing program. There is a free look-alike Word compatible program at www.openoffice.org and another one at www.kingsoft.com .

- Another program is a spreadsheet called "**Excel**". We will be using Excel to do minor calculations. Again, there is an open office and Kingsoft version of Excel.

- The last program is called "**Acrobat**" Acrobat is the reader for the .pdf (portable data file) files on which the class net pages are based. You can get a free Acrobat reader (read only, no write) at www.adobe.com

Standards: This class will be using the English system of measurement, sometimes called the FPS system (foot, pound, second). All measurements and data will be given and recorded in the data.decimal format. That is, instead of a measurement being recorded as 2¼ amperes, the data should be recorded as 2.25 amperes.

Grading: All quizzes, projects, and exams are graded on a point system. The final grade in this class will be given on a percentage of total possible points: 100-90% = A; 89-80% = B; 79-70% = C; 69-60% = D, < 60% = F.

There are 1000 possible points in this class as follows: Final exam 250 points, Midterm exam 250 points, Research paper 250 points, Quizzes 250 points. (extra credit class participation 50 points).

Any student going into the final exam with an A will be excused from taking the final exam and will receive a grade of A for the course. Any student with a grade of B may take the final or not, at the student's option, if you think it will better your grade.

Quizzes: All quizzes will be posted for the entire semester at the beginning of the semester. There are 10 quizzes posted on the web page for ten weeks beginning the 1st week of class. It is due at the beginning of the following week's class. It will be graded by the computer program and posted to the website as soon as possible. Each quiz is worth a possible 25 points in the final grade. Here is the procedure for the quizzes:

1. At any time during the semester, but before the quizzes are due, you may take the quiz as many times as you wish (on the web page). However, your grade will be for the ***LAST*** time you take the quiz.
2. The quiz is due at ***11:59 pm the day before class.*** Thus, a class that meets on Thursday will have the quiz due on Wednesday just a minute before midnight.
3. During the week following the due date a reasonable excuse (sick, car broke down, etc.) will extend the due date with the (email) written permission of the instructor.
4. The quiz software allows you to email yourself the dated quiz grade. This email is the only proof you have that you took the quiz.

Exams: There are two exams in the class ... a midterm and a final. Both of these will be posted at the beginning of the class and you can practice on them at any time. However, the grade you will receive will be the last exam that you take online. Note that there are two lab partners to a computer and I encourage lab partners to collaborate on the answers to the exam.

Cheating: It is impossible to cheat on my quizzes or exams. All quizzes and exams are TAKE-HOME OPEN-BOOK, OPEN NOTE, OPEN FRIEND, and I encourage study groups to meet and discuss the questions and answers.

Guided Experiments: Each class will have a hands-on experiment or project to complete. You must show me your finished experiment in order to complete the class for that day. Please note that it is NOT necessary for the experiment to "work". Thomas Edison made a thousand failed experiments before he got the light bulb to work. Any experiment that does not work as expected within 15 minutes of the posted end of class time may get full credit for the class by showing me the work done. There will be a 25 point deduction from your grade for not completing the experiment, working or not. An absence from class may be made up at any time during the semester on a case-by-case basis.

Project paper: One formal report will be required. ***Late papers will not be accepted.*** See the website documents for details of the report and the class schedule for due dates.

Sample project paper: There will be a very simple project paper written in the first three weeks of class. The paper will NOT be graded but returned so that you can see what my standards and grading policy are.

Attendance: Up to three unexcused absences will not affect your grade, but you must make up the lab/test/quizzes that were missed.

Sick/Absent: We all get sick. It happens. It happens in Spring semester more often than Fall. We all pull jury duty from time to time. We all get traffic tickets and have to appear in court. Stuff happens. If "stuff" happens on a class date when something is due, then I want an email or phone call from you PRIOR TO THE CLASS that you will be absent and the reason. I'm also reasonable about that. If you are in an accident and cannot get to a computer or a phone prior to class, I'll take some written documentation after the fact about what happened.

> *Due to the recent outbreak of influenza I am asking you that if you are sick, STAY HOME. There will be nothing said or done in class that will affect your ability to answer questions on the quizzes or exams.*
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> *However, quizzes are still due when they are due. If you are so sick as to not be able to sit at a computer, I'll postpone your due date until you are no longer contagious and able to take the quizzes (please have somebody call or email me and let me know what is going on). Unfortunately, that may pile two or three quizzes to be done in a week. We'll work on it.*

Time: The formal class time is three hours long. There is space for ten minutes of "break time" in each of these hours. You are welcome to take one thirty minute break, two fifteen minute breaks, three ten minute breaks, six five minute breaks, or however you wish to arrange your break time. I'm not holding a stopwatch on you.

HOWEVER, if your job works right up to class time and are going to be continuously five or ten minutes late, just tell me so that I know. It doesn't bother me to accommodate your work hours.

It is also true that some of you will work faster than others. Some have done this stuff before, and others are brand new to it. The assignments are given so that 95% of the class will be able to finish the project in the allotted time. That means that most of you will finish early.

Emergency Procedures: All students are expected to read and follow the "emergency procedures" on the class website www.rstengineering.com/sierra .

Cell Phones & Entertainment Devices: Cell phones are to be set to "vibrate", "stun", or OFF during the class (emergency exceptions will be made with permission of the instructor). No entertainment devices (headphones, ipods, mp3 players, etc.) will be operated during class time. Classroom computers will be used for classroom work only; surfing and email are not to be done during class time.

Office Hours: I will be in the classroom for a half-hour after every class. If you need a private space in which to talk to me, I will make a private office available. Just ask. No problem.

Communication: At the top of this page are my personal email address and my home phone number. Please do not hesitate to use either one. Email any time. Phone after 7 am and before 9 pm please.

Website: There will be a website on my personal business web page at *www.rstengineering.com/sierra* with the notes for all prior weeks, the quizzes and exams, the class grades as I have them, and other items of interest for your download dining and dancing pleasure.

Veterans: First, thank you for your service. There is an old saying ... if you can read this page, thank a teacher; if you can read this page in English, thank a veteran. I will make any reasonable accommodation that you may need.

Medical Needs: Please advise me privately of your situation. Should special accommodations be required please have the DSPS office (Rocklin in Winstead, NCC in the P building, TTC in the Main Office) send me the evaluation and accommodation requirements, preferably by email. I will do everything in my power to help you with the class.

Learning Outcomes: By the end of the semester, the student should be able to…

- **Analyze and demonstrate relationship between electric current, voltage and resistance;**
- **Construct functional electronic circuits using soldering;**
- **Distinguish components of an electrochemical cell and construct a working cell.**