COURSE SYLLABUS

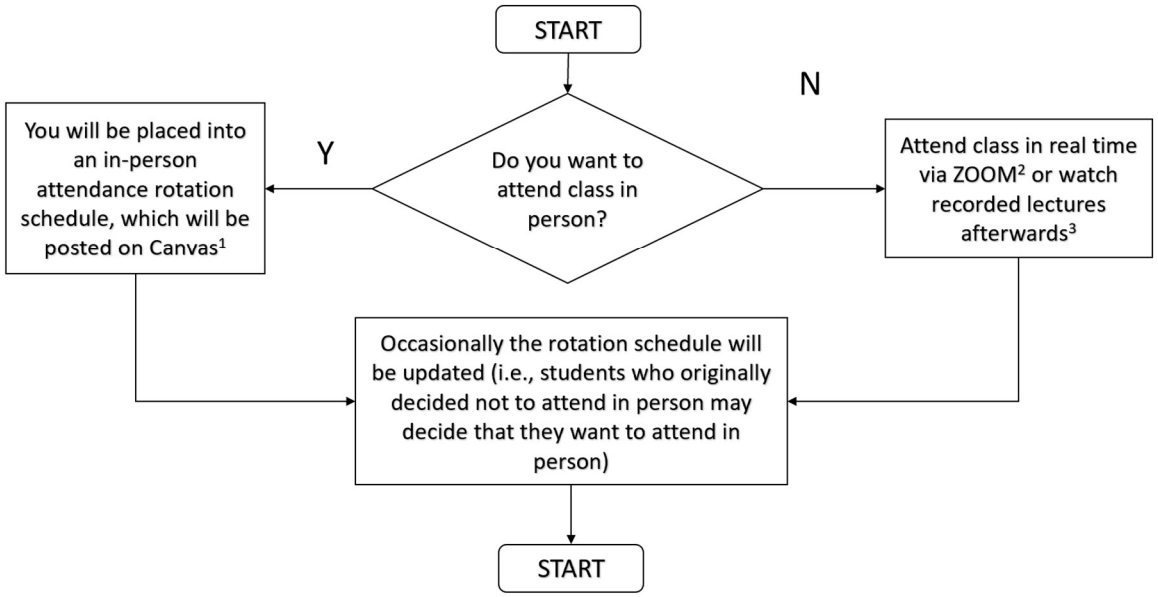
Instructor Charles Nuttelman BIOT D1B14 Charles.Nuttelman@Colorado.edu

Class Meetings

Section 001: 1:10 - 2:00 p.m., MWF, BIOT A108
Section 002: 3:30 - 4:20 p.m., MWF, BIOT A115

NOTE: Because of the current COVID outbreak, it is very important that all students realize and accept that a great deal of flexibility is required both by the instructor as well as the students in order for the course to run smoothly. I have set up the course to accommodate a variety of different situations that we might encounter during the semester.

I also understand that there are students who strongly wish to attend class/lecture in person whereas there are other students who would prefer to be involved with the course in a remote fashion as much as possible. I realize that the schedule may warrant changes during the semester due to possible outbreaks of COVID, but here are some features of the *most likely scenario* for CHEN 3010 this fall:



[1]Because of physical distancing stipulations, BIOT A108 is limited to 20 students and BIOT A115 is limited to 26 students.
[2]All students will be able to attend *any* class in real time via ZOOM
[3]All students will be able to watch recorded lectures at any time; no penalty for missing class (i.e., any clicker questions will be available for extended periods of time)

- I have classrooms reserved on M/W/F for each section: BIOT A108 from 1:10-2:00 PM and BIOT A115 from 3:30-4:20 PM
- I would like to have an optional in-person component to the course in the rooms and times above. We are limited to 20 students in BIOT A108 and 26 students in BIOT A115, *so obviously not every student can attend every class*, unless there is only a small subset of students who want to regularly attend class.

- For students who would like to "attend" lecture remotely at the same time (times/days above) as the in-person lecture, I will offer each lecture as an interactive ZOOM meeting. You may miss out on some of my gestures in class because only the screen is being captured, but I think that the ZOOM lectures will be almost as valuable as attending in person. I will pause periodically to answer questions in the chat option in ZOOM.
- Note that because of the physical distancing requirements set out by the university, BIOT A108 will be limited to only 20 students and BIOT A115 to 26 students. *This means that not every student will be able to attend in person every day. It is very important that you realize this.* Those students wishing NOT to attend class in person will be taken off of the in-person rotation schedule, but this rotation schedule will be reevaluated every 2-3 weeks.
- I will also be recording my lectures so that you can watch at a different time.
- In order to give students time to work in groups on Workshops, some Fridays (possibly 1/3 or so of all Fridays) will be reserved for you to work remotely together on workshops (via ZOOM).
- Instead of the typical 2 nighttime midterm exams, you will take 5 shorter/lower stakes online quizzes throughout the semester.
- Weekly Help Sessions/Office Hours (see below) have been reserved for Tuesdays, 2:50-4:05 PM in BIOT A104 (starting September 1st).
- As per campus policy, all students must wear masks 100% of the time while in the Biotech building.
- All assignments/work will be submitted electronically on Canvas. Homework assignments will generally be due on Wednesdays at 11:59 PM MST. When workshops are assigned in class (or outside of class), they will be due by 11:59 PM of that day (submitted on Canvas).

Undergraduate Assistants

John Green	John.G.Green@Colorado.EDU
Mary Kelly	Mary.D.Kelly@Colorado.EDU

The UG course assistants will be primarily involved with homework grading.

Office Hours

Because of the current COVID outbreak, no students are admitted into instructor/professor offices for office hours. All office hours must be conducted online or in large lecture halls.

I have reserved BIOT A104 on Tuesdays from 2:50-4:05 PM for a weekly Help Session/Office Hours. Note that because of physical distancing requirements, this room is limited to a capacity of 15 students. I will be strictly enforcing this capacity and students can attend this help session on a first come, first served basis. If demand continually exceeds capacity in this room, I may implement a rotation schedule for Office Hours, as I will be doing for lecture.

I also have additional office hours online using ZOOM on Wednesdays from 9:00-10:00 AM (link sent out to class email 5-10 minutes beforehand). If you need assistance at any time, please try me via email – I find email to be a very effective way for me to answer questions. Please consider keeping your emails short and concise 😊

Text **Applied Statistics and Probability for Engineers**, **6*th Edition***, Douglas C. Montgomery and G. C. Runger, Wiley, 2014. Note that this is NOT the most recent edition of the book, but I find that there is not a significant enough difference between the 6th and 7th editions to warrant requiring

the 7th edition. Furthermore, it will be much easier for students to obtain used (cheaper) versions of the 6th edition than the 7th edition.

UPDATE: The CU Bookstore is having a hard time finding 6th editions, so I have also authorized the 7th edition to be used by students. In the reading assignments, I will specify the equivalent reading assignment in the 7th edition to the 6th edition reading assignments.

Software Excel 2019/Office 365 with Solver/Analysis Toolpak add-ins (earlier versions OK)
Minitab (available on the Virtual Desktop – more info later)

Clickers

Because not everyone will be in class every day, Clickers are OPTIONAL. However, I would REALLY like it if you could interact and answer the Clicker questions when you are in class – you'll learn a lot more and I will be able to gauge what you do and do not know.

iClicker devices are available at the CU Bookstore (I'm guessing that many of you already have these from previous classes), you can find them used, or worst case you can borrow one from Norlin library for the semester for free (see link below). It is possible that if you forget a Clicker device on a given day (in person) then you could submit answers using REEF, but I cannot guarantee that they will go through properly given the warnings about internet speed from OIT (see above). If you are watching from elsewhere on ZOOM, you MUST use iClicker REEF (online/app based); obviously, your iClicker device won't reach the Clicker base in the classroom!

All the information related to iClicker REEF, like setting up an account, is found here:
https://oit.colorado.edu/services/learning-spaces-technology/cuclickers/help/student-resources

When you search for Applied Data Analysis, it is best if you first search simply by "Boulder" and then you can search by "CHEN 3010" or "Nuttelman".

IMPORTANT: The internet speeds/capacity in Duane G1B30 is not sufficient to handle a large number of students using iClicker REEF. Therefore, when you are in class (in-person), you need to use an iClicker device (NOT your smart phone or computer/tablet). If you happen to forget your iClicker device, it will be fine if we have a few students using REEF in the classroom.

Why should you want to take this course?

No practical engineering work gets done without taking measurements of some type, and, in today's world, most measurements are automated with modern instrumentation and computer-based data acquisition systems. Important decisions are made based on data acquired through measurement systems; consequently, dealing with measurement errors and the appropriate application of statistical methods are critically important.

In the immediate future, you will be required to make such measurements and interpretations in your Chemical Engineering Laboratory courses, and, in the more distant future or perhaps sooner, you will be carrying out such activities in a professional setting. It is important that you be equipped with the knowledge and practice required for industrial measurement and data analysis before you are confronted abruptly with their need.

What are the objectives of the course?

Please see the **Learning Goals** hand-out for the course.

What are the prerequisites?

You will need to have completed mathematics through calculus, differential equations, and linear algebra. You should have completed a course in fluid mechanics, or at least be taking such a course currently.

Computer skills required in the course will be facilitated with Excel. *We will rely heavily on basic Excel skills that you learned in CHEN 1310*. However, you will NOT need to rely upon VBA skills that you learned in that course. We will also use the Minitab program, but you will find that reasonable to pick up as you go along.

Why do the parts of the course come in the order they do?

The content of this course follows closely the contents of the Montgomery text, and other standard texts. It is a logical building sequence, starting with the foundation topics of probability and distributions, proceeding with sample statistics and inference, and finishing with regression analysis and design of experiments. The last topic is more advanced, but the exposure provided in this course is considered to be introductory.

What will a typical class period be like?

The course meets three times per week for 50-minute periods each. Before most classes, you will be required to watch and interact with (by answering the in-video questions) several Learning Modules. These are similar to Learning Modules in CHEN 1310, if you had me for that class. These Learning Modules will be the main way that you are exposed to new material for the first time, in addition to the daily reading assignments in the textbook.
Thus, you will come to class prepared with a general idea of the topics for that day. Then, the rest of class is aimed at solidifying those topics, answering any questions that you might have about those topics, and implementing those ideas by solving some example problems.

In the non-COVID version of the course, a significant group exercise is planned for each class meeting in order to provide some type of experiential, "hands on" activity related to the course material. I will try my best to encourage and provide time for students to interact in groups, but obviously because of COVID restrictions all group work must be done online/remote (i.e., ZOOM).

To make all this work well, cooperation of students is required, especially coming to class/logging on to ZOOM prepared, having studied the assigned reading and interacting with the Learning Modules assigned for each class.

I discourage, and effectively forbid, students taking and using the work of another student or giving their own work to another student. That is unethical and is treated more severely than you may be accustomed to. It is also unethical to possess or make reference to a complete solutions manual for the course text.

What is the purpose of the assignments?

As mentioned above, reading assignments and Learning Modules are to be completed before the lecture for which they are assigned. If you haven't completed these items, you won't get nearly as much out of class. I would like to use the class meeting to amplify the reading material and answer questions about the parts with which you have difficulty. I do not plan to "regurgitate" text material.

Homework assignments are to provide practice exercises so that you learn better some of the methods and concepts presented in the lecture. Often, you will be developing methods that will be of use, either verbatim or with minor modifications, in later courses of your curriculum, especially Chemical Engineering Laboratory.

Does Dr. Nuttelman accept late assignments?

Unless you have a medical or other emergency (please contact Dr. Nuttelman as soon as possible to make arrangements), *I do not accept late work*. Unless otherwise noted, all work is to be submitted electronically on Canvas. Everyone makes mistakes from time to time and either forgets to do an assignment or forgets to submit an assignment. This is why I drop a portion of the lowest scores on various assignments at the end of the year (see below in "Grading Basis").

Why has the particular text been chosen?

The Montgomery text has been chosen by your instructors because of several reasons:

It is a good, introductory treatment of applied statistics.
$\Rightarrow$ The book is filled with realistic examples and problems.
$\Rightarrow$ Computer-based methods and vector-matrix descriptions are included.

What will the quizzes test?

There are 5 quizzes throughout the semester and a Final Quiz at the end of the semester. All are online. The quizzes and the Final Quiz give you the opportunity to demonstrate, independently, that you have learned well the concepts and methods of the course. Students who are on top of the material and have completed all their assignments generally score highly on the quizzes. You should note that quizzes are only moderately important when it comes to your final grade, representing only 30% of that grade.

Quiz Schedule

All quizzes are online and you must take the quiz individually (questions will be randomized) at the time frames indicated below. Quizzes will be open from noon on the Friday (or Wednesday) indicated below and due by Sunday (or Friday) at 11:59 PM; you can take them at any point during that timeframe. Once you begin each quiz, you will have ONE HOUR to complete it. Quizzes are open book/open notes but you must complete them on your own!

Quiz 1	Friday, 9/11, 12:00 PM – Sunday, 9/13, 11:59 PM
Quiz 2	Friday, 10/2, 12:00 PM – Sunday, 10/4, 11:59 PM
Quiz 3	Friday, 10/23, 12:00 PM – Sunday, 10/25, 11:59 PM
Quiz 4	Friday, 11/13, 12:00 PM – Sunday, 11/15, 11:59 PM
Quiz 5	Wednesday, 12/2, 12:00 PM – Friday, 12/4, 11:59 PM (*subject to change!)

Final Quiz Schedule

TBD (this will most likely be during the normal Final Exam time, which hasn't been posted yet), online

Grading Basis

	Percentage
Homeworks	35%
Workshops	20%
Learning Modules	15%
Quizzes	20%
Final Quiz	10%

NOTE: The following will be dropped at the end of the semester:

- Lowest single Homework assignment
- Lowest 5-10% of Workshops (exact # TBD)
- Lowest 5-10% of Learning Modules (exact # TBD)
- Lowest Quiz (NOTE: the Final Quiz cannot be dropped)

Classroom Behavior

Both students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote or online. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. For more information, see the policies on classroom behavior and the Student Code of Conduct.

Requirements for COVID-19

As a matter of public health and safety due to the pandemic, all members of the CU Boulder community and all visitors to campus must follow university, department and building requirements, and public health orders in place to reduce the risk of spreading infectious disease. Required safety measures at CU Boulder relevant to the classroom setting include:

- maintain 6-foot distancing when possible,
- wear a face covering in public indoor spaces and outdoors while on campus consistent with state and county health orders,
- clean local work area,
- practice hand hygiene,
- follow public health orders, and
- if sick and you live off campus, do not come onto campus (unless instructed by a CU Healthcare professional), or if you live on-campus, please alert CU Boulder Medical Services.

Students who fail to adhere to these requirements will be asked to leave class, and students who do not leave class when asked or who refuse to comply with these requirements will be referred to Student Conduct and Conflict Resolution. For more information, see the policies on COVID-19 Health and Safety and classroom behavior and the Student Code of Conduct. If you require accommodation because a disability prevents you from fulfilling these safety measures, please see the "Accommodation for Disabilities" statement on this syllabus.

Before returning to campus, all students must complete the COVID-19 Student Health and Expectations Course. Before coming on to campus each day, all students are required to complete a Daily Health Form. Students who have tested positive for COVID-19, have symptoms of COVID-19, or have had close contact with someone who has tested positive for or had symptoms of COVID-19 must stay home and complete the Health Questionnaire and Illness Reporting Form remotely. In this class, if you are sick or quarantined, please let the instructor know ASAP so that arrangements can be made for you to complete the missed work.

Accommodation for Disabilities

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the Disability Services website. Contact Disability Services at 303-492-8671 or dsinfo@colorado.edu for further assistance. If you have a temporary medical condition, see Temporary Medical Conditions on the Disability Services website.

Preferred Student Names and Pronouns
CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

Honor Code
All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code (honor@colorado.edu); 303-492-5550). Students found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the Honor Code Office website.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

The University of Colorado Boulder (CU Boulder) is committed to fostering an inclusive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, or protected-class discrimination or harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or cureport@colorado.edu. Information about the OIEC, university policies, anonymous reporting, and the campus resources can be found on the OIEC website.

Please know that faculty and instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, dating and domestic violence, stalking, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.

Religious Holidays
Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance.
See the campus policy regarding religious observances for full details.